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# ARMED FORCES management

PUBLISHED FOR THE ARMY, NAVY, AIR FORCE, COAST GUARD AND MARINE CORPS

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*Navy R&D's Jim Wakelin . . .*

## New Look in Navy Research . .

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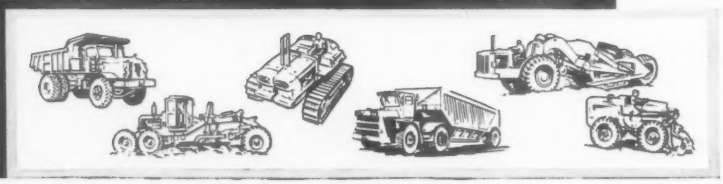

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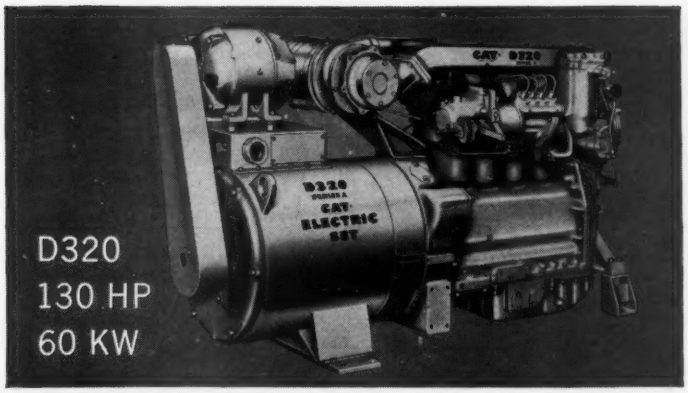


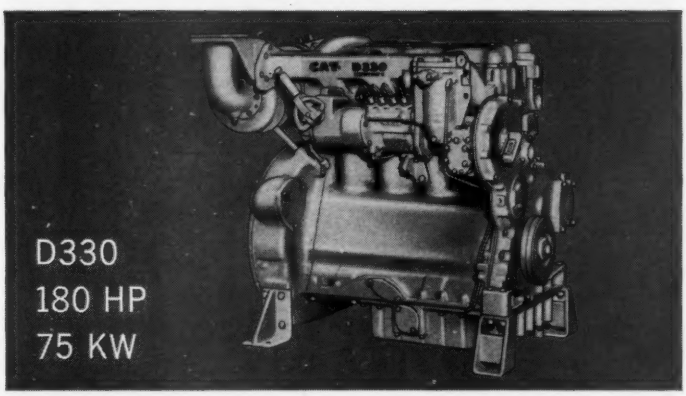


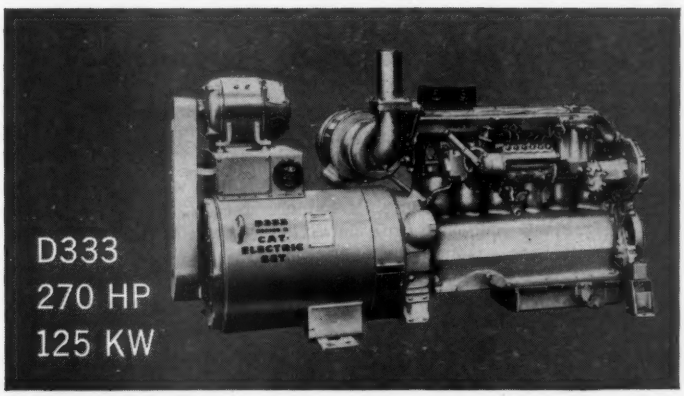

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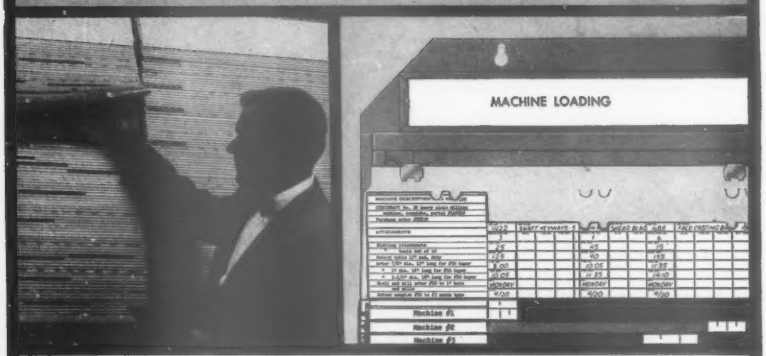


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ARMED FORCES management

PUBLISHED FOR THE ARMY, NAVY, AIR FORCE, COAST GUARD AND MARINE CORPS

AUGUST, 1960

Volume 6—No. 11

## FEATURES

**New Look in Navy Research: The Organization** ..... 17

*First of a two part series on how the Navy does its research and development business. Technological advances—in terms of both rapidity and complexity—have forced the Navy to take a long look at their research organization, measuring it against the job that it has to do. This was done a year ago, and it appeared that there had to be some changes made. These two articles show the direction that the changes have taken, and why they were made.*

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*A rundown on Army's European supply operation—the headaches, the management techniques, the way the system works.*

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*Two sides of a controversial issue. What is the function of the value engineer, and where does he fit in the military organization?*

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## FEATURED NEXT MONTH

*New Look in Navy Research: The Management Techniques . . . Better Research at Less Cost*

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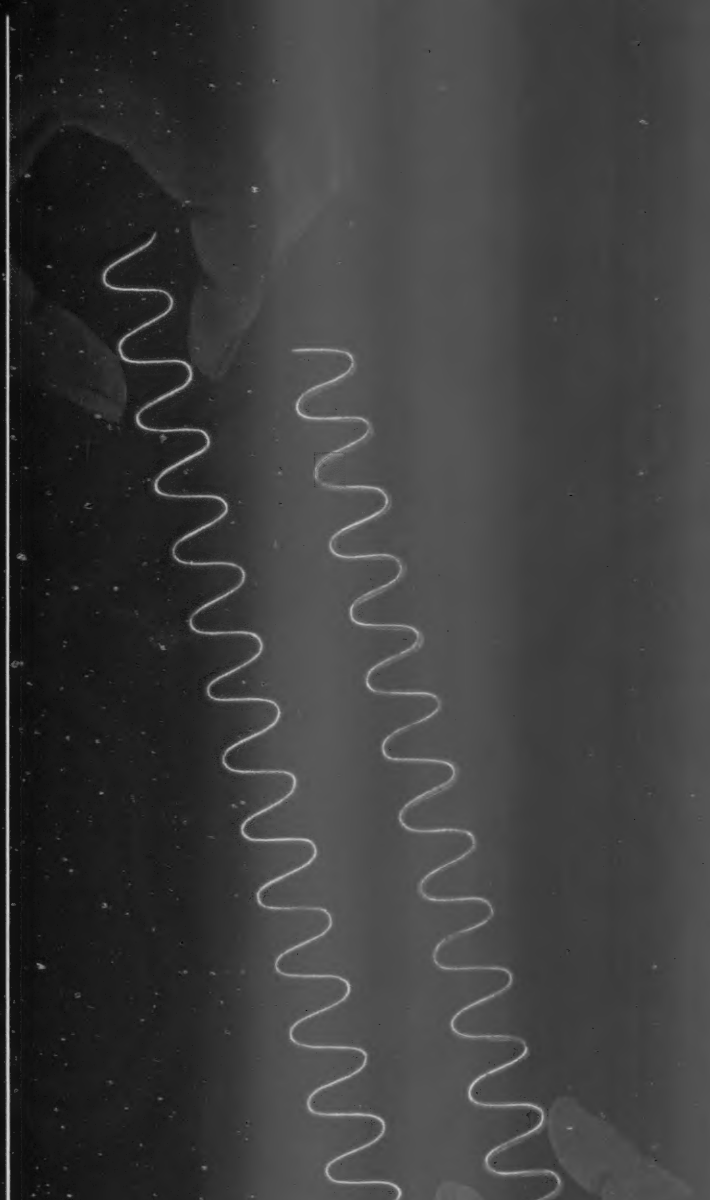

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# NATO At The Crossroads

IT WOULD be far better for Free World nerves, if not Free World goals of spreading democracy, if the U.S. would take the sort of lead expected of it in guiding the North Atlantic Treaty Organization toward setting up a solid, unbreakable front which gives Communism no choice but to back down.

It has taken ten years to build in NATO a willingness to sacrifice autonomy for the common good—a necessary NATO keystone which existed only in theory when the treaty was signed over a decade ago. There are unmistakable signs that this desire to place being part of the team first in Nationalist thinking is even seeping into the top political levels, where lack of it has given NATO most of its troubles in the past.

Unfortunately, now that NATO has reached a crossroads, it appears more likely that it will be prodded down the right road by a reaction to Communist pressure than led down the right road by the strong guiding hand of its board chairman, most prominent and affluent member.

We spent 30 days early this summer touring military installations in Europe, asking about the real, or imagined, lack of punch in the military arm of NATO. The replies were virtually unanimous in noting a surge of mutual confidence, a psychological endorsement of the NATO idea by the military elements of member nations.

One Brigadier General summed it up this way, "In the four years that I have been here I've watched NATO-SHAPE get some real teeth in it. I've seen solid progress. Primarily because of things which had little to do with military decisions, progress takes time. But we're a lot more potent today militarily than most people give us credit for—except the Communists."

ADDING UP headaches in communications, pressing national outside interest, and a host of other given reasons, the one biggest reason why NATO hasn't developed faster was and still is the fear by other member nations that the U.S. does not really intend, over the long haul, to take NATO quite as seriously as its high flown oratory might indicate.

Our lack of enough concrete action to back up our conversation has forced the rest of the team to back into NATO very slowly, try (while they are supposedly becoming part of a unified force) to maintain as much autonomy in their military structure as possible. NATO is after all only a philosophy and (hardware notwithstanding) it will work only as well as the idea is accepted and actively endorsed by *all* the members.

Even a committee needs a strong chairman to steer the meetings if it is to be effective. We throw NATO all sorts of bouquets from across the seas, rarely back them up up until Communism turns on the heat somewhere.

Item: While talking about a mix of weapons, (an arsenal in which no one piece of armament is dominant but in which the sum goes to make up an unbeatable force) we spend more and more money on long range missiles, squeeze funds out of activities supporting police forces. It is hard for a cab driver in Berlin to be awesomely impressed by the knowledge that there is an ICBM sitting in Southern Wyoming pointed at Moscow. And he can't understand how the Communist border guard he drives by every day is going to be much impressed either. His question: We may be able to shoot around corners and blow up the world but would we try it if a group of Red "volunteers" started a street fight in West Berlin?

ITEM: OUR research and development effort in the use of nuclear weapons has cracked its rudder while we palaver across the table with an adversary who doesn't really want agreement anyway, can achieve what he is after as long as he can keep us sitting and talking. At the same time, from a NATO standpoint, we fold our hands and stare at the sky and pretend that the "haves" in atomics are the only ones who are going to get.

Item: The only real "from each according to his ability" planning we have done through NATO has been in the lien on nations for operational forces. (Even at that, the current planning document takes little account of missiles, is four to five years outdated.) For instance, the only pooling of resources we've done of any significance in research and development has been the anti-submarine warfare research laboratory in La Spezia, Italy. Cross-purchase hardware has been done but nearly always unilaterally working against virtually no integrated plan.

When Free World Allies come to the Pentagon with requests for advice on how they might best use their best talents in that very vital 75% of an armed forces strength—from creation through supply of hardware—they get a lot of sympathy, no practical advice backed up by anything besides a handful of personal opinions by men without the power of decision.

PROBLEM is that the real brunt of U.S. influence and determination to stay in NATO is being carried internationally by anonymous U.S. military officers—not the nation's leaders.

Newspaper headlines and our own State Department notwithstanding, there is a rather impressive and heartening stack of evidence mounting up that our NATO Allies could make tremendous strides if we did some very deep and serious planning (backed by solid, organized procedural machinery) to put the recognized best of each into a single framework.

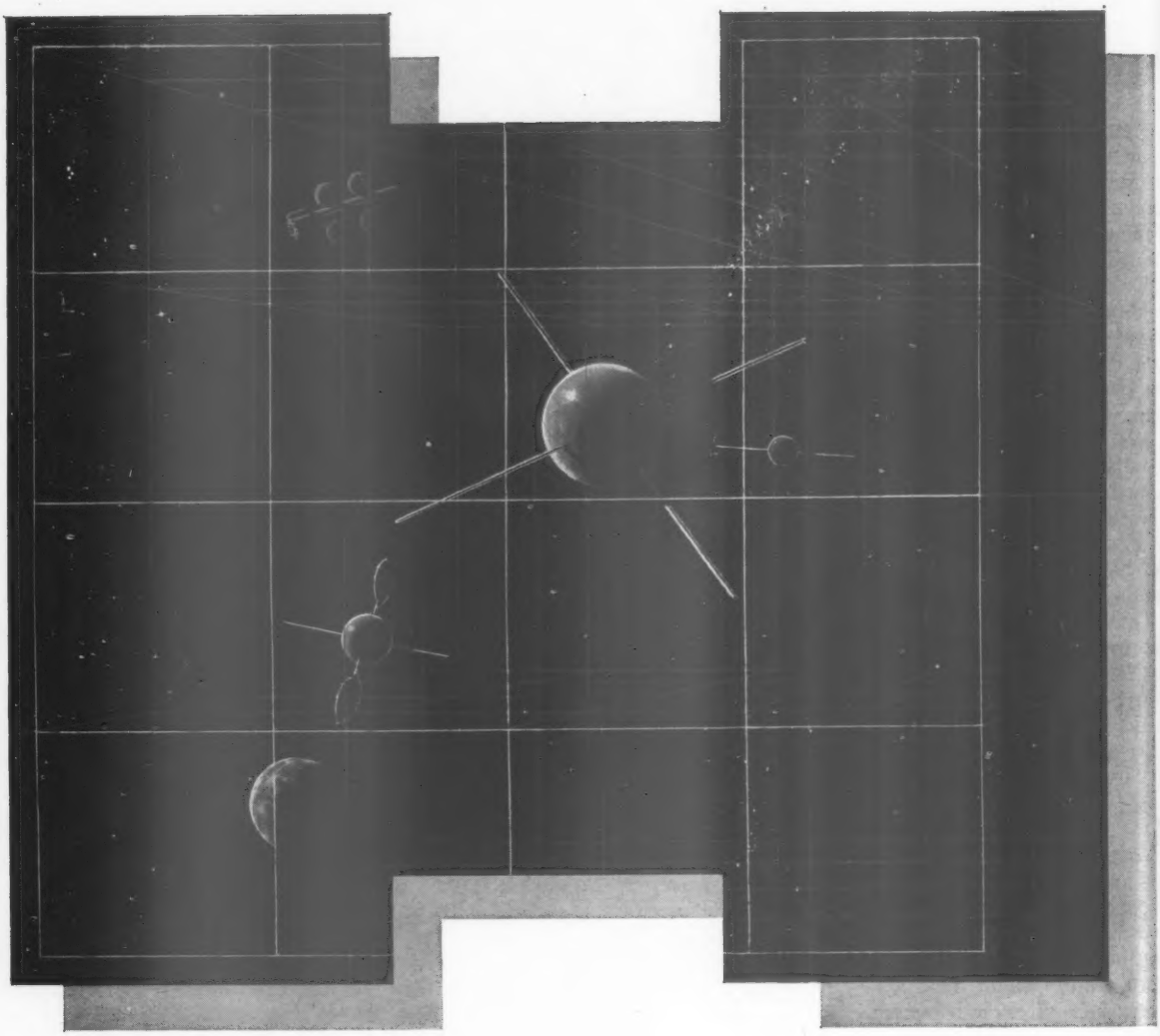
In many unspectacular but convincing ways they have been turning to the chairman of the committee for guidance and the order to "go!" Unfortunately, the chairman has fallen asleep.

***Bill Borklund***



Starting with an etching *made from an original drawing*

# How to take a satellite



# census

**At present rates, man will soon have space cluttered with numerous orbiting objects. These objects are creating a major space-age problem.**

This extra-atmospheric clutter can be resolved, sorted and classified at great range by a new systems concept of satellite intelligence now being developed by Hughes.

The prime sensor is a highly flexible, computer-programmed radar which can chop space into billions of small information cells on thousands of simultaneous beams.

This enormous multiple-beam capacity permits search, track and examination of huge numbers of targets. It also provides the capability for transmitting control information to defense systems or satellite platforms.

**These alpha-numeric displays,** *developed by Hughes Fullerton engineers, can simultaneously plot hundreds of fast-moving aircraft.*

**Starting with an etching** *made from an original drawing, this extremely small electrode structure is created by vacuum deposition. The unusual matrix of memory cells is used in Hughes data processing equipment.*

These capabilities require a new beam-scanning technique, a major step beyond frequency or phase control of arrays. This kind of advance is typical of the work done by Hughes in radar.

For Hughes was the first to develop three-dimensional radar, the most important advance in the state of the art since radar itself was invented.

This work draws on Hughes' unique experience in virtually every area of advanced electronics, including: space ferries, microwave communications systems, airborne control systems, air-to-air guided missiles, signal recovery techniques, radar and IR detection systems, and many others.

The reliability and operational capabilities of these systems have earned them the confidence of users throughout all the free world.

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# Washington Background

**TO SOLVE SAC'S AIR ALERT MONEY PROBLEMS,** idle Pentagon conjecture is wondering "why not a rapid phase-out of the B-47," using the savings to pay for the airborne operation—rather than asking Congress for more dollars. Assuming 110-150 aircraft are enough to handle the deterrent job, the present B-52 force has enough planes in it now and the B-47 is dead—and very expensive—weight.

**THE "CHEAP" MINUTEMAN HAS BUMPED INTO PRICING PROBLEMS.** In going over its shopping list, Air Force has discovered that it costs almost twice as much to put Minuteman on railroad cars as in hardened sites. One big reason: payments to railroad labor unions for standby crews. After extensive studies into vulnerability to long range attack, how many needed to do the job, etc., etc., AF has concluded it must put most of planned Minuteman forces in concrete holes.

**FRESH SLICING FOR THE DEFENSE BUDGET PIE** may be seen next year, if one group of reasoners in the Pentagon can make their point. Given loss of foreign bases as a starting point (Morocco, Japan), the reasoning runs thus: Without foreign soil, the only way we can maintain brushfire forces is to put them in ships. The logical conclusion: more money for Navy, Marines, and less for Air Force and Army.

**MORE MONEY FOR DEFENSE NEXT YEAR**—barring a completely recalcitrant Congressional situation—seems virtually inevitable under the pronouncements of this year's Presidential candidates. Even before the conventions, the sole point of agreement among a completely diverse crew of hopefuls seemed to be that more money—and a more vigorous approach—were needed in the Defense effort.

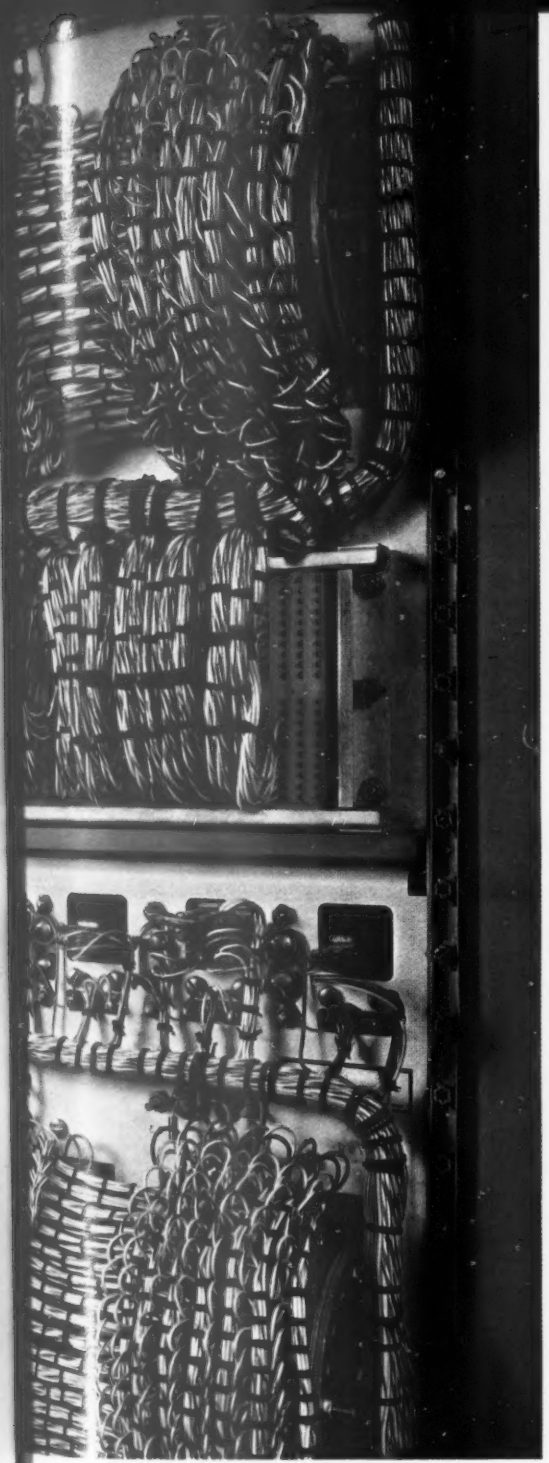
**FUNDING TO COMPLETION, A BREAKAWAY FROM TRADITIONAL BUYING** and contracting methods was proposed as a way of doing business to this year's Congress. To be initiated by Navy's BuShips, the aim is to avoid coming up short at the end of the year, having to cancel some programs to be sure that any are completed.

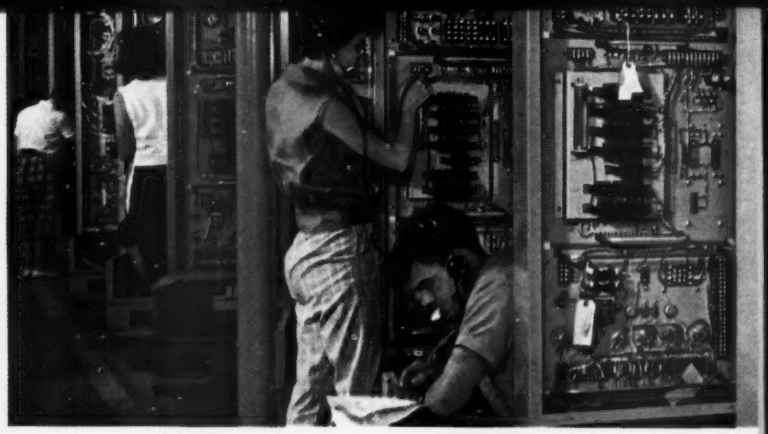
**FOUR MAJOR OBJECTIVES ARE SET FOR THE NEW FUNDING METHOD,** according to Navy Secretary Franke: (1) Congress will get more realistic cost estimates, (2) full ship programs can be awarded in the year authorized, (3) new money supplemental requests will become a thing of the past, and (4) cost adjustments should no longer force program cancellations.

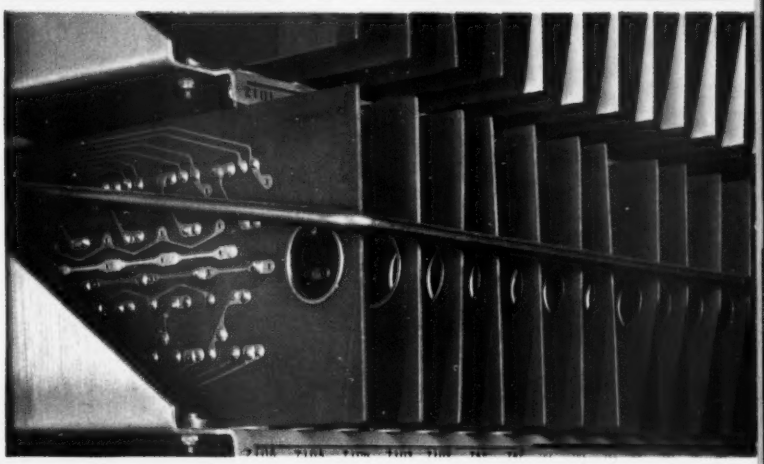
**MORE POLARIS SUBMARINES—AND PERHAPS POLARIS SURFACE SHIPS** will be covered under a supplemental budget request likely to be forthcoming. By the time Congress is back after the conventions, Navy should be in the happy position of arguing from the standpoint of success, with crucial submarine firing test set for the very near future as this issue goes to press.

**GOOD ARGUING POINT FOR AIRCRAFT CARRIERS** as a limited war tool was handed to Congress by CNO Arleigh Burke recently, being basically a matter of getting there fustes' with the mostes' Burke pointed out that carriers currently deployed around the world can more than double their air strength "in a very short time." Advantage is to be able to tailor the force to the situation, certainly to be desired in an off-again-on-again cold war situation.

**BENDING OVER BACKWARDS FOR THE BEST BUDGETARY BALANCE** within the Defense Department—in terms of getting enough of everything for everybody on an overall basis—got more than the usual stress this year. Major means of doing this was a matter of giving as many people as possible a chance to have a say in the final document.







**On guard against air attack**—The Martin Missile Master electronic air defense system will protect ten major metropolitan areas by year's end. First installations have been delivered ahead of schedule and are now operational. According to the Army, Missile Master "will provide the most efficient and economical control and distribution of firepower available for the defense of strategic areas in the continental United States."

*At 00h 00m 01s GMT, July 1, 1960, Martin logged its 590,304,000th mile of space flight*

MARTIN

# The sure hand of AE in automatic command communications

Helping "man" the missiles at the Vandenberg Air Force Base is a new 3500-line automatic telephone intercommunications network installed by AE.

Advanced switching techniques permit this exchange to set up any desired combination of conference or command circuits in a matter of seconds, provide taping of conversations, and interconnect with outside lines via microwave.

Complex circuit routing such as this is not new with us—AE has had a hand in the development of specialized communications systems for the armed forces for over 50 years.

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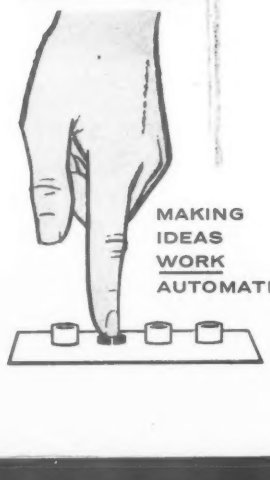

MAKING IDEAS WORK AUTOMATICALLY

## ASW REPORT OUT

A comprehensive, 3-volume report on how Navy's anti-submarine warfare program looks from the industry side of the fence has been released by National Security Industrial Association.

Based on over a year's study of the Navy's ASW setup, the report is generally favorable to what Navy has done in the past, but does not fail to point the way to future improvements.

Specifically, from an organization standpoint the report highly endorsed work done by the ASW Readiness Executive Office, the establishment of the DCNO/Development, and the top level ASW committee under Secretary Franke.

On the other hand the report urged that Navy set up an anti-submarine information center as soon as possible to eliminate "much repetitious work" in both Navy and industry.

From a technical standpoint, the report pointed to the need for such items as industry's own target submarines; new, special-purpose manned, mobile, sonar underwater vehicles; better test ranges for evaluating torpedoes and missiles and a "crying need" for more oceanography information.

Acknowledging ASW as Navy's number one priority problem the report went on to state the need for such things as mobile search platforms, increased acceptance by Navy of a fixed ammunition concept, and the advantages of pre-packaging torpedoes for immediate use without further testing by the fleet.

From a contracting standpoint, the NSIA group recommended greater flexibility in research and development contracts, more effective service and maintenance contracts to achieve optimum equipment performance, and more contracts for feasibility studies to explore projects before specifications are written.

True value of the report lies in its comprehensiveness. While basically little new ground is covered in the report, such a comprehensive rundown on the status of ASW from an industry standpoint is unquestionably worthwhile from both industry and Navy sides of the fence.

## AEROSPACE CORP GROWS

Aerospace Corp.—a new non-profit group set up to advise Air Force on its missile and space program management—will probably take on work for other agencies as it expands.

Such agencies might include National Aeronautics and Space Administration, or Advanced Research Projects Agency, according to Board Chairman Roswell L. Gilpatric.

However, such an expansion would definitely be in the long range planning category. As yet, Aerospace is in early formative stages, with final organization sessions to get underway at Air Force Secretary level probably sometime this month.

Plans call for Aerospace to work on cost plus fixed fee basis for the Air Force. It will function "in an advisory capacity somewhere between the procedure now being followed by Mitre Corp. and the policies used by Space Technology Laboratories in its early relations with missile contractors."

Primary job of Aerospace will be "accelerate programs in such areas as advanced re-entry vehicles, including penetration aids, new propulsion and guidance systems, satellite communications systems, satellite inspection systems, manned military space systems and other corollary undertakings."

Besides such programs as Samos, Midas, Discoverer, the new advisory group may possibly work with Sky Bolt air-launched ballistic missile program and other new missile weapon and satellite systems for early warning, reconnaissance and communications.

While it not yet clear how large the organization will finally be, about 1400 people will come from STL as Aerospace takes over contracts formally with that organization.

Further explaining the new organization, Board Chairman Gilpatric said "Unlike STL this is a non-profit organization. There is no question of competition with industry; no question of getting into hardware."

## MAHON SLAPS MILITARY

Chairman George Mahon (D-Tex.) of the House Defense Appropriations Subcommittee has sharply criticized Pentagon officials for not keeping Congress better posted on program cancellations.

Mahon referred specifically to the Air Force F-108, the B-70 and Navy's elimination of SeaMaster and Regulus II programs.

Mahon said the record would show that Navy cancelled the $500-million SeaMaster program without consulting his committee and asking for its advice.

He also said the record would show that "Navy cancelled the Regulus II program involving many millions of dollars, and that the Air Force cancelled the F-108 fighter and practically cancelled the B-70 and that the Boron fuel program running into many millions of dollars was likewise cancelled without consultation with this committee."

## ANP CLARIFICATION

There will be no decision between direct and indirect cycle approaches to the nuclear aircraft propulsion system by Sept. 1.

A misunderstanding on this point arose earlier this year before the Joint Congressional Atomic Energy Committee. Defense officials informed the group last week that such a decision is not imminent and other sources indicate the decision may take two more added years of research.

In another atomic power development, a full power run of Kiwi-A-Prime, second experimental reactor in the Rover program to demonstrate feasibility of nuclear rocket engines, was run this month at the Jackass Flats area of AEC's Nevada Test Site.

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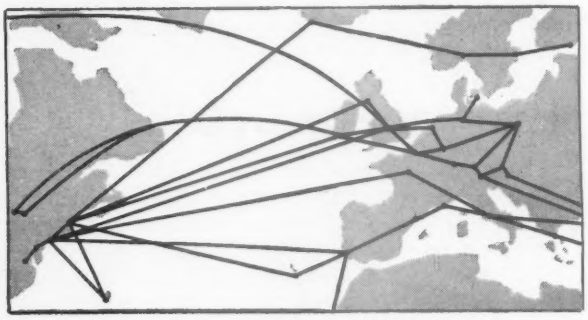

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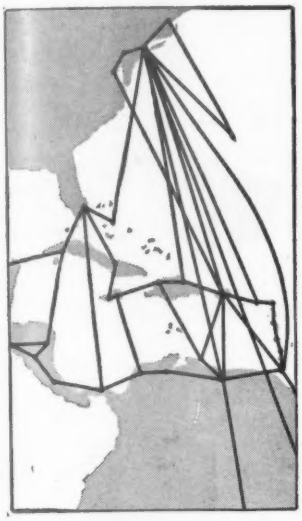

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PART I

# *New Look in Navy Research:*
# The Organization

***A HEADLONG PLUNGE into the nuclear missile age has forced Navy to take a close look at its methods of supplying up-to-date equipment to the fleet. Given last year's Franke Report as the springboard, Navy has reacted to the challenge. Dealing with everything from submarines to supersonic aircraft, Navy has had to give itself the best possible research and development organization it could devise, and work only with the most effective management tools.***

**by Captain Carl O. Holmquist**
**Technical Assistant**
**Office of the Assistant Secretary of Navy (R&D)**

AT CRITICAL TIMES in the nation's history, a powerful factor in our success has been our talent to organize and manage successfully the great industrial galaxy that is the United States.

At times in this process, there has been fumbling, indecision and mismanagement which have resulted in wasted effort, money and resources: but over the years in major national endeavors and industrial growth, we have shown imagination, initiative and flexibility.

With this in mind it is worth noting that today, with the opportunity, the competition and the risk greater than ever before, many large and successful corporations are decentralizing for more effective operation.

Paradoxically, the government, to improve the country's ability to cope with new challenges and exigencies, is moving directly toward greater centralization in both operations and management. The Department of Defense Reorganization Act of 1958 was a concerted effort to centralize management and control in an enterprise with a $41-billion yearly budget—by far the world's largest "corporation." In research and development it is plain that there are increasing efforts to manage and direct program details from Defense Department level.

In the past, it has been Navy policy to critically self-examine its organization and procedures periodically and institute changes to insure maximum combat effectiveness and administrative efficiency of the Navy in light of advancing technology, changing national threats and reorganization in other governmental agencies. The latest Navy study was made in 1958 by the Committee on Organization of the Department of the Navy, called the Franke Board. Many recommendations by the Board have already been followed or are in the mill. Still others are under study.

Two fundamental characteristics of Navy organization have evolved and have been retained through the years: decentralized authority and responsibility, and the bilinear structure of Navy organization. The Franke Board reaffirmed the Navy bilinear system with its division of duties and responsibilities. In the Board's opinion, this system offers a greater prospect for the success of future naval warfare because of its more effective integration of Navy's industrial and military elements. In particular, the Board felt this form of organization is best suited to exploit opportunities from continuing breakthroughs in the physical sciences.

## *The New Berths*

As a result of the Franke Board proposals, three important changes were made in Navy's organization for research and development. First, the Bureaus of Aeronautics and Ordnance were joined to form the Bureau of Naval Weapons. This was done in December, 1959. Also, two key positions were created and filled: Dr. James H. Wakelin was appointed Assistant Secretary of the Navy for Research and Development and VAdm. John T. Hayward was named Deputy Chief of Naval Operations for Development. These two important positions grew out of a need to recognize the increasing importance of research and development in our present technological era.

In recent months, Navy research and development policies and procedures have been readjusted to accommodate these changes. But to explain Navy's present organization for research and development, and just how the new system works, a bit of background is required. Let's start with basic Navy organization.

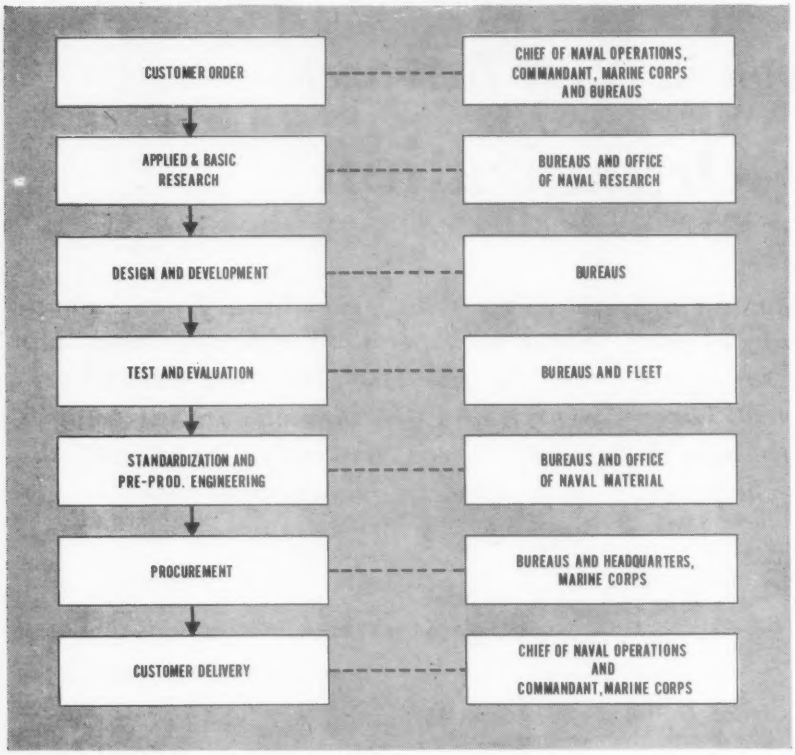
Basically, Navy's organization follows a bilinear system, embracing two lines of control. Both lines emanate from the Secretary of the Navy and are his principal command lines in administrating the Department of the Navy. On the one side is the "military command" side of the house, under Chief of Naval Operations. This side works mainly with operations and with training and developing the capabilities and readiness of the military forces. Chief of Naval Operations is also principal assistant and advisor to the Secretary of the Navy on all military matters.

The other side is the "business administration" side of the house, primarily concerned with providing equipment, material, personnel and services needed to meet military requirements. This side of the house also handles business management of Navy efforts in meeting operational requirements.

For equipment and weapons, Chief of Naval Operations and Commandant of the Marine Corps are the "consumers;" hence, they are responsible for setting requirements on *what* is needed, *when* it is needed and *where* it is needed.

In contrast, the bureaus and asso-

## *How things get done . . .*


CUSTOMER ORDER
CHIEF OF NAVAL OPERATIONS, COMMANDANT, MARINE CORPS AND BUREAUS
APPLIED & BASIC RESEARCH
BUREAUS AND OFFICE OF NAVAL RESEARCH
DESIGN AND DEVELOPMENT
BUREAUS
TEST AND EVALUATION
BUREAUS AND FLEET
STANDARDIZATION AND PRE-PROD. ENGINEERING
BUREAUS AND OFFICE OF NAVAL MATERIAL
PROCUREMENT
BUREAUS AND HEADQUARTERS, MARINE CORPS
CUSTOMER DELIVERY
CHIEF OF NAVAL OPERATIONS AND COMMANDANT, MARINE CORPS

ciated shore activities under the direction of the Secretary, the Under Secretary and the Assistant Secretaries, are the "producers" of equipment and weapons. They are responsible for *how* requirements of the "consumers" will be met.

There is no direct line of authority between operating forces and the bureaus and offices of the Navy except through the Secretary of the Navy. Of course liaison and coordination are constantly used between both sides of the house. A "military administration" function is exercised over the Bureaus and the Shore Establishment by the District Commandants under CNO, and covers such matters as security, intelligence, discipline, communications and other matters of naval operations and administration.

### *Consumer and Producer*

This "consumer-producer" relationship leads to the second fundamental principle of Navy organization—decentralized authority and responsibility.

Navy, unlike a general staff organization, delegates authority and decentralizes responsibility to the lowest level possible consistent with efficient and business-like operations and compatible with the Navy's mission. This principle can be readily seen, both in the overall organization of the Navy Department and in the organization of fleets, bureaus, laboratories and field activities—in fact, the entire Navy Shore Establishment.

Navy has and must support forces of widely different capabilities and characteristics. A close look shows supporting research and development in the Navy involves just about every type of equipment and weapon in the national arsenal. Primary interests involve air, surface, sub-surface, and land operations. In our ships, we have weapons and equipment needs unique to the Navy. Also we have the naval air arm with all its diverse demands. We also have a specialized amphibious landing force—the Marines—with equally specialized requirements for weapons and equipment. It is clear that Navy's research and development program must be, and is, broad and diversified.

Navy's organization for research and development is as complex and diversified as its research and development program. The main elements of the Navy involved in research and development again, make Navy's bilinear structure clearly evident.

Secretary of the Navy exerts policy control over all Navy matters, including research and development. Next is the Under Secretary of the Navy, whose major duties lie in financial management, and in insuring that business administration and management of the Department is carried out efficiently and economically.

Just below the Under Secretary of the Navy is the new Assistant Secretary for Research and Development. He is responsible for policy, management, and control of Navy research, development, test and evaluation matters, including general management of the appropriation involved. He coordinates and directs efforts of the bureaus and offices and the Headquarters, Marine Corps in fulfilling research, development, test and evaluation needs of the operating forces.

### *What ONR Does*

Advisor to the Assistant Secretary of the Navy for R&D on research matters is Chief of Naval Research, RAdm. Rawson Bennett. Among other duties, he has responsibility for conduct and coordination of naval research and exploratory development to augment and in conjunction with research and development programs of other bureaus and offices. Chief of Naval Research also provides budgeting, accounting, and related reporting services for the Assistant Secretary that he needs for management and control of the Navy RDT&E appropriation.

Under the Chief of Naval Operations are the Vice Chief of Naval Operations and the various Deputy Chiefs. The Vice Chief of Naval Operations has under him the Long Range Objectives Group which plays an important part in formulating Navy's research and development program. Also under CNO is the Deputy Chief of Naval Operations for Fleet Operations and Readiness. His group is composed of "warfare desks" which generate operational needs of the fleet for new equipment and weapons.

The new Deputy Chief of Naval Operations for Development coordinates formulation of operational requirements for R&D which come from the warfare desks, and issues them to appropriate bureaus. DCNO (D) also coordinates and integrates research, development, test and evaluation programs of Navy and Marine Corps to insure the total effort is continuously responsive to long range objectives, immediate needs, fiscal limitations and advancing technology. He also informs and advises ASN (R&D) on development, test and evaluation programs.

Through the medium of operational requirements for *what*, *when* and *how many*, DCNO (D) in effect has much to do with coordinating and directing efforts of the bureaus and offices even though there is no direct authority from the Chief of Naval Operations to the technical bureaus except through

the Secretary. Much effort by DCNO (D) personnel aims to insure that operational requirements are up to date and reflect the latest needs of the warfare desks and fleet operating units.

The agencies which develop and procure equipment required by Navy operating forces are the six bureaus, Office of Naval Research and the Marine Corps. With Navy bilinear structure, these bureaus and offices report to the Secretary for prosecution of projects to support specific requirements of CNO, Commandant of the Marine Corps and Chief of Naval Research. The bureaus and offices are also responsible to the Secretary for planning, initiation, conduct and business administration of their own research and development programs.

The bureaus and offices perform a dual function—they *manage and conduct* research and development efforts, and they *procure* equipment and weapons required by operating forces. They may act as contracting agents for the Navy if research, development or production is done by industry or private institutions, or they may act as management agents if this work is performed by Navy in-house. Technical and fiscal management is peaked at the Bureau level for each program and the bureaus and offices perform detailed accounting of funds allocated to them.

In keeping with the principle of decentralized authority, relations between the bureaus and offices and the laboratories and field activities are generally similar to those between Chief of Naval Operations and the bureaus. Thus, the bureaus generally instruct laboratories and field activities on the *what, when* and *where,* but the *how* of the work is left to the discretion of the field activity. Little or no attempt is made by bureaus to manage the details of activities or project work at laboratories and field activities.

## *New Method, New Plane*

For example, the former Bureau of Aeronautics might have sent a project to the Naval Air Test Center to test a particular model airplane to find its suitability for carrier operations. Naval Air Test Center would be further instructed to report to the Bureau on test results. The project directive would include the appropriation subhead to be used to charge off costs of the work. No other detailed instructions would normally be given by the bureau to this field activity other than the broad management instructions applying to all field activities.

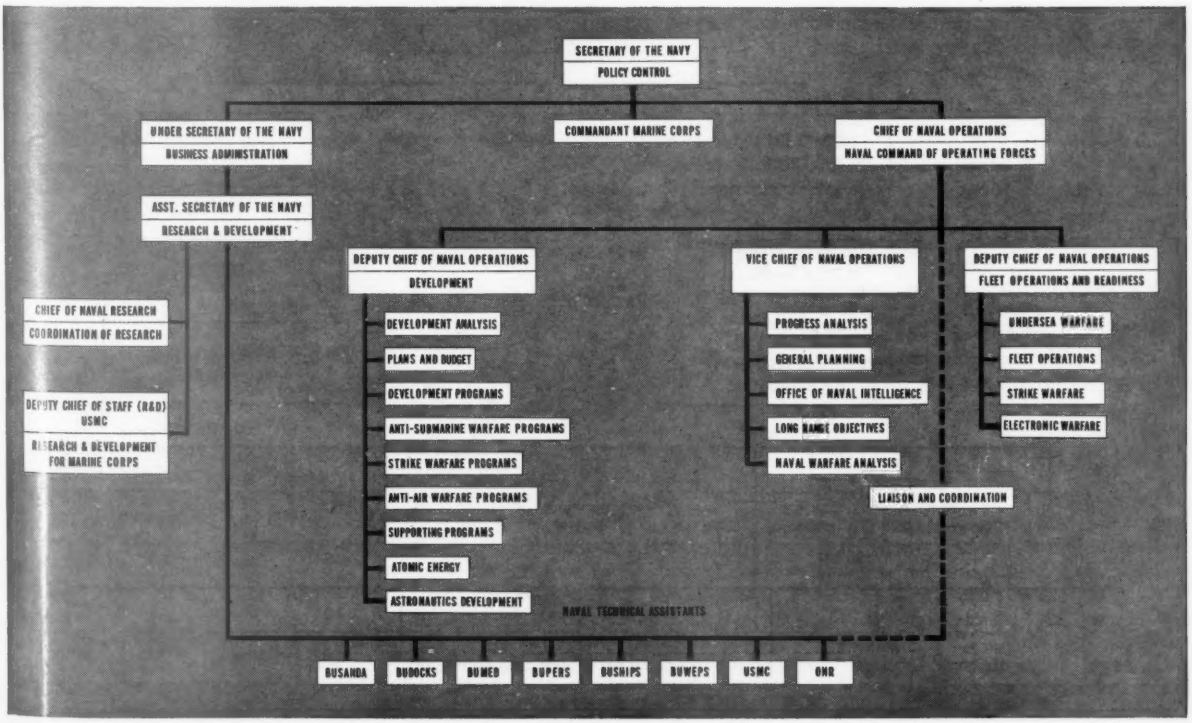
In other laboratories and field activities, particularly those of the former Bureau of Ordnance, detailed technical management of a project may be delegated directly to the laboratory (such as Subroc at the Naval Ordnance Laboratory, and the Talos, Tartar and Terrier systems at the Applied Physics Laboratory, Johns Hopkins University). In such cases, the Bureau retains overall management control and fiscal functions while technical program details are directed by laboratory personnel.

Coordinating functions for the research and development program exist on both the military and the producer sides of the Navy house. On the military side, the Deputy Chief of Naval Operations for Development works closely with the warfare desks of the Office of the Chief of Naval Operations as far as R&D requirements are concerned. The warfare desks supply fleet and Marine operational requirements to DCNO (D). Requirements are coordinated by DCNO (D) and transmitted to bureaus and offices for development and procurement.

Deputy Chief of Naval Operations for Development as Chairman, Chief of Naval Research and representatives of the warfare desks form the Navy Research and Development Review Board. This Board reviews the annual RDT&E program to insure it represents, as nearly as possible, a true priority list of operating requirements.

On the other side Navy's bilinear system are technical bureaus and Office of Naval Research, which manage Navy research and development work. Representatives of these bureaus and offices, together with Chief of Naval Research, and DCNO (D), comprise the Navy Research and Development Committee. Dr. Wakelin, the Assistant

## *How the organization looks . . .*



## *The chain of events . . .*

Secretary of the Navy for Research and Development, chairs this committee. The Navy Research and Development Committee advises the Assistant Secretary of the Navy (R&D) on research, development, test and evaluation matters. This Committee also reviews Navy's research and development program and advises on technical and fiscal aspects.

In summary, there is technical R&D coordination on the bureau side, and there is coordination of the military requirements of the R&D program on the military side of the house. Finally, there is top level coordination since the Assistant Secretary, Chief of Naval Research and DCNO (D) work closely together.

With the foregoing in mind, it is worthwhile to trace a typical Navy development program through the chain of events which make up the product R&D cycle.

First, there is the customer order. In the Navy this takes the form of an operational requirement for new equipment for the fleet. Navy "customers" are Chief of Naval Operations, the Commandant of the Marine Corps or, at times, the bureaus themselves. These customer orders go to the appropriate bureau or office for action.

In general, development of new equipment will call for some increment of basic or applied research. It is likely that most of this basic or applied research will be completed—or in progress—before the requirement is issued.

Navy's basic research is conducted primarily by Office of Naval Research although each bureau and office carries on a small part of the total basic research effort either in-house or through contracts with industry or educational institutions. All such work is coordinated by Chief of Naval Research.

### *Who Does What*

Applied R&D is done mainly by the bureaus, and to a small extent by ONR, in response to CNO requirements. Applied research and development is coordinated and integrated into over-all Navy RDT&E by DCNO (D).

Next comes design and development. Here, the bureaus take over completely and perform the job either by contract to industry or by project directives and work orders to laboratories or field activities.

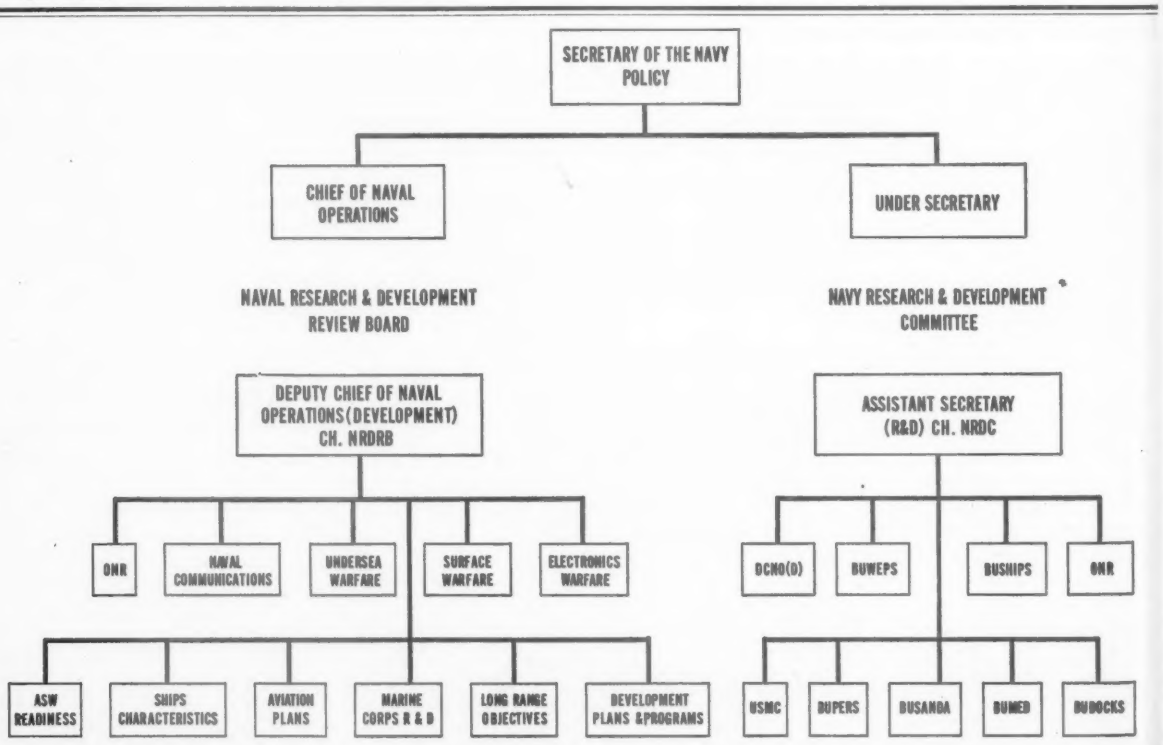
Once design and development is done and equipment is available, test and evaluation begins. The bureaus, usually through field activities, initiate a test and evaluation program to insure the product developed complies with the original specifications and requirements. Also, through the Operations, Test and Evaluation Force, the fleet has an early chance to evaluate the equipment to insure that it will work with the fleet.

When a product successfully passes evaluation and testing and a decision has been made to buy, standardization and pre-production engineering takes place. The bureaus are responsible for this phase, but Office of Naval Material also has an interest, particularly if critical materials are required. ONM reviews progress of the product at this stage to insure standardization, reliability, maintainability and productibility.

Next in the cycle comes procurement of weapons and equipment for delivery to the fleet. The bureaus and Headquarters, Marine Corps are the Navy's buying agencies. Normally, Marine Corps procures most of its equipment through other agencies such as the Navy bureaus or the Army Technical Services. However, some are procured directly from the contractor.

Finally, the customer who originally placed his order receives the equipment when it is delivered to the fleet and the Marine Corps for operational use.

### *Keeping posted on what goes on*



*Army's Com Z in Europe:*

# Why "The Impossible Is Taking A Little Longer"

***Little publicized even in the Pentagon, U.S. Army Europe efforts to get its peace time supply operation ready to go immediately in time of war threaten to generate a support system revolution overseas. And the shake-up that has come so far is only a beginning . . .***

**by C. W. Borklund**

RIGHTLY or wrongly, U.S. Army's handling of its vast supply networks has a reputation among a vociferous group of Congressmen and many U.S. taxpayers for being inherently and expensively wasteful.

Reluctantly excused in war time, peace time errors—even the cliff-hanging peace of a cold war—get short shrift from the men paying the bills. And photographs of row upon row of military equipment rusting in an open field, or stacks of supplies rotting in mountain caves will probably always be "good copy" for the daily press.

Considering its history (see box), the United States Army, Europe (rear)/ Communications Zone has all the basic ingredients for receiving a high percentage of the brickbats thrown—size, complexity, widely dispersed operations, degrees of personnel competence from best to worst.

Size alone should be enough: Com Z's 74,000 people handle an average 50,000 weekly supply requests, control a two million ton, $1.7-billion inventory spread all over Europe, operate 25 separate depots, ship 9.4 million barrels of petroleum products each year over 540 miles of petroleum pipeline, run up an average annual operating cost of $195-million.

Com Z had its share of bumps on the Hill.

Headline hunters often criticized with a will shortly after 1950, when USAREUR was given depot sites which amounted to ruined military casernes, long-abandoned airfields, or isolated forests. But in the last few years, the squawks have almost died out, to be replaced by high praise from U.S. industrialist-visitors who have seen the efficiency of Com Z operations.

Only a minor reason that complaints have faded is the big geographical gap between Capitol Hill and Com Z headquarters in Orleans, France.

Most credit stems from a concerted re-organization and insistent effort to develop new, improved procedures for top management across the continent —from USAREUR Commander Gen. Clyde D. Eddleman in Heidelberg, Germany, to Port Area command chiefs on the West Coast of France.

## *Just a Beginning*

Latest big change has been to put USAREUR Deputy Commander, Maj. Gen. H. R. Westphalinger in direct charge of Com Z, reporting to Eddleman and thereby re-emphasizing Com Z status as a major USAREUR command. The idea: get Com Z as a peace time operation ready to go immediately in time of war, to divorce Heidelberg —far forward and vulnerable—as much as possible from support functions. (Some operations must stay at the front to meet peace time needs but Ordnance, Quartermaster and Transportation Corps operations have been moved to the rear completely.)

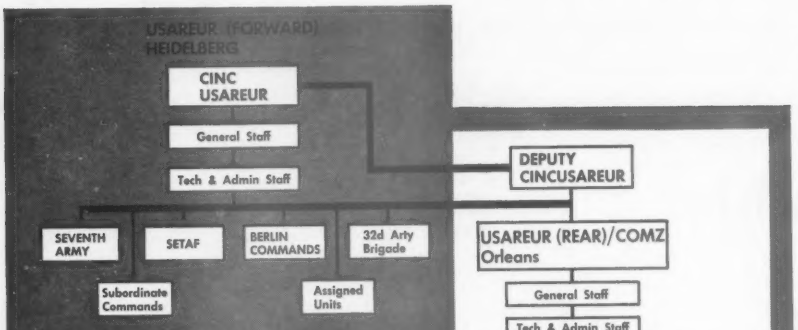
This is only a start, and it will take time to work out the growing pains. But, in a year or so, Com Z officials will be ready for more innovations.

Putting USAREUR's Deputy Commander in charge of supply has been a big factor in better supply management but so has the organizational structure underneath him. Biggest single element is TASCOM (for Theatre Army Support Command) headquartered at Verdun, which controls all 25 general and special depots throughout Com Z, runs the post control system (with one central administrative control point for several posts) and handles a share of Com Z's housekeeping in the field.

Not shown on an organizational chart of Com Z are the outfits which see the system runs the way it should, provide the wherewithal Army needs to fight with. These are the Supply Control Agencies created by each tech service, serving to provide TASCOM management instructions on what to do. This is not really the true management it would seem. TASCOM manages a depot, the SCA's handle the supplies.

SCA's order and distribute supplies in the system, keeping necessary management records. Their system is linked by a data transceiver network. Automatic data processing helps the agencies considerably in controlling what is in each depot, receiving requisitions from their customers, and directing shipment from the right depot—or obtaining the item from

## *How Com Z is Set up . . .*




some other source. Either the U.S. supply system, procurement in Europe, or from Com Z's maintenance (or rebuild) program.

The rebuild program, incidentally, has been praised as "more efficient than our commercial practices in the U.S." At an average yearly cost of some $54-million (mostly spent by Ordnance), Com Z is saving about three-fourths the new cost of same hardware. This is done primarily with combat and transport vehicles, aircraft and components, radio and radar components, material handling equipment, and major engineering hardware.

In Army's two million-ton Com Z supply stockpile, about three-fourths is stored for wartime use. Of the 650,000 separate line items in Army's inventory, ranging from nuts and bolts, to finished missiles, Com Z actually stocks 320,000—nearly half of the total Army line item inventory.

But stockage lists are not static. If less than, say, five demands for an item are received in a year, the item is dropped from the stock list and depots stop requisitioning on the U.S. for replenishment. (This of course, varies with the tech service—Ordnance, for instance uses an 8-count.) Conversely, if more than the given number of demands come in during a year, the item goes on the list and depots stock it.

Repair parts are, and have always been a thorn in the side of Com Z managers. Because of this, and the resulting efforts, many of the better management techniques have come in this area.

Case in point: Because many repair part requisitions in the system represent dollar value far less than processing and shipping cost, Com Z has begun using what they call the EOQ or Economic Order Quantity concept.

Under this concept, selected items with unit value under $1 are ordered in EOQ's of up to 12 months supply or total order value of $1,000, whichever is less. They handle 33,000 items this way and, although the idea is fairly new, it already promises to reduce the number of requisitions by from 50 to 60%. On this basis, the concept is now being expanded to items with a $5.00 unit value.

At the other end of the spectrum, a few high cost items represent a significant dollar portion of Com Z inventory. With a management-by-exception technique similar to Air Force's hi-valu program, Com Z top management gives special attention to these big ones.

In brief, these top drawer items are pulled from routine automatic processing, given close personal attention by Com Z's top supply managers. These items are inventoried often to insure record accuracy, delivered to customers faster-than-normal to reduce pipeline level, and their supply control is continually studied to insure standard requirements are valid and current.

Said one colonel, "This special management lets us give daily personal attention to 26% of our dollar inventory while actually dealing with only four-tenths of 1% of the items we routinely stock."

More important to the customer, Com Z is backing up these high level managerial procedures with a new direct requisitioning process, instituted primarily for the Seventh Army, Com Z's most important customer.

The system is used mostly for repair parts. While costs are high, pipeline savings—coupled with improved combat readiness stemming from less equipment out of commission for parts —leaves Army satisfied the cost is worth it.

Order and Ship Time will be cut from a former forty days to a much

## *Background: How Com Z Was Created*

*In the vernacular of the French who are hosts for most of Com Z's facilities, we are living in the reign of Communication Zone the Third.*

*The first Com Z was organized by General Pershing in 1917, became widely known as the SOS, for Services of Supply. Headquartered in Tours, the comparatively small system supplied an average 330,000 tons of material a month to our forces in France.*

*World War II created Com Z II, commanded most of its life by Lt. Gen. J. C. H. Lee, General Eisenhower's deputy. Responsible for the U.S. European supply system from D-Day to war's end, it was a huge complex originating in the U.S. and Britain. Its supply lines entered Europe primarily at Antwerp, Belgium, Le Havre and Cherbourg on the West Coast of France and at Marseille on the Mediterranean, poured an average 2½ million tons of supplies monthly into Europe.*

*When World War II ended, our supply line across France was rolled up and U.S. occupation troops in Germany were supplied with what they couldn't requisition on the economy (or get from leftover World War II stocks) by a new pipeline running from Bremerhaven in Northern Germany south.*

*Although the system was economical, it was also vulnerable. The rape of Czechoslovakia plus the Berlin crisis in 1948-49 prodded the U.S. into seeking an agreement with France to set up our supply line across the French continent again. The agreement was tied down none too soon.*

*It provided for using three major French port areas —Saint Nazaire, La Pallice, and Bausons; provided for using French roads and railroads, let us construct a depot system across France, station troops and install communications. (One measure of what this has been*

faster average of ten. Signal Corps goes one better, reacts at mail order house speed, filling top priority requisitions in four days. Under normal operations, requests go from SCA to supply depot to customer. Under direct requisitioning, the channel is customer to depot with records going to SCA after the fact.

A corollary problem in terms of time —and one which adds to the headaches of supplying a large modern operation such as Seventh Army—stems from what is basically an unending headache. Com Z officials estimate that about 40% of the equipment that goes forward to Seventh Army comes back to them for reasons of obsolescence.

Besides the headaches of ironing out wrinkles in the relatively new setup, there are plenty of hurdles which make the problems often seem as big as the progress. One, of course, is the Com Z environment. Each step in the unending search for improvement creates difficulties in personnel orientation, procedural planning and indoctrination. One reason why: Of the 700 or so people in Ordnance Supply Agency alone, about 50% are French clerical types and most can't speak English.

### *More Headaches*

Another problem: Real Estate. Say Com Z officials, "after ten years of renovation, hardware, and spending about $250-million, our plan today is reasonably adequate for the job on hand. It has always been difficult to acquire land and it is even harder today."

Population pressures and economic expansion in already crowded country have created this situation. Bureau of the Budget limit on real estate and construction money (none provided last year) haven't helped. Theoretically, Congress has authorized another $50-million to finish Com Z supply line construction but Com Z hasn't seen it.

But in spite of their problems, Com Z has dispersed storage operations, maintained efficiency of central supply control. The consensus of opinion was voiced by one Com Z official who said:

"The using unit generally has all it's supposed to have and it's serviceable. We're doing the job with minimum manpower and maximum control. The paperwork is done by the direct support unit and on up. We've really relieved the tactical unit in the business. And most important, our supply system is extremely responsive. We can shove the stuff anywhere they want it, often faster than they ask for it—as we proved during Lebanon."

In summary, the job is to support logistically U.S. Forces in Europe—from the ports and beaches, through the depot system to the ultimate consumer. The job is being improved every day and Com Z intends to keep it that way. The ultimate goal is summed up in a slogan Com Z has adopted from World War II:

"The Difficult We Do Immediately: The Impossible Takes A Little Longer."

**COMMUNICATIONS ZONE RESOURCES**

(Some representative figures)

TOTAL TONS ON HAND: *2,000,000*

PETROLEUM PRODUCTS MOVED/YEAR: *9,400,000 BARRELS*

DOLLAR VALUE OF INVENTORY: *$1,350,000,000*

PORT RECEIPTS/YEAR: *365,000 TONS*

**COMMUNICATIONS ZONE SUPPLIES**

(Some representative figures)

MILITARY PERSONNEL: *37,000*

CIVILIAN PERSONNEL: *37,000*

TRUCK TRANSPORT FLEET: *1,000 TRUCKS AND TRUCK TRACTORS*

RAILROAD CARS: *2,000*

NUMBER OF DEPOTS AND PLANTS: *31*

*worth: at a "tremendous saving" the low-cost railways in France can be used to haul about 80% of total Com Z tonnage, except for petroleum.)*

*Physically, the system hadn't even begun to move when Korea blew up in the Free World's face, prompted military strategists to look apprehensively at our military posture in Europe—certainly a prime area for Soviet expansion. In the crash program which followed, thousands of tons, especially ammunition, were shipped from the U.S. and pulled back from Germany to build up war reserves in a far-from-complete communications zone.*

*Even as Army tried to build this vast supply complex, it had the twin headache of jacking up peace time procedures to the tempo of war. The result was touch-and-go in Europe.*

*Mobilization and combat preparations touched off by the Hungarian uprising in 1956 was better. Suez was better yet.*

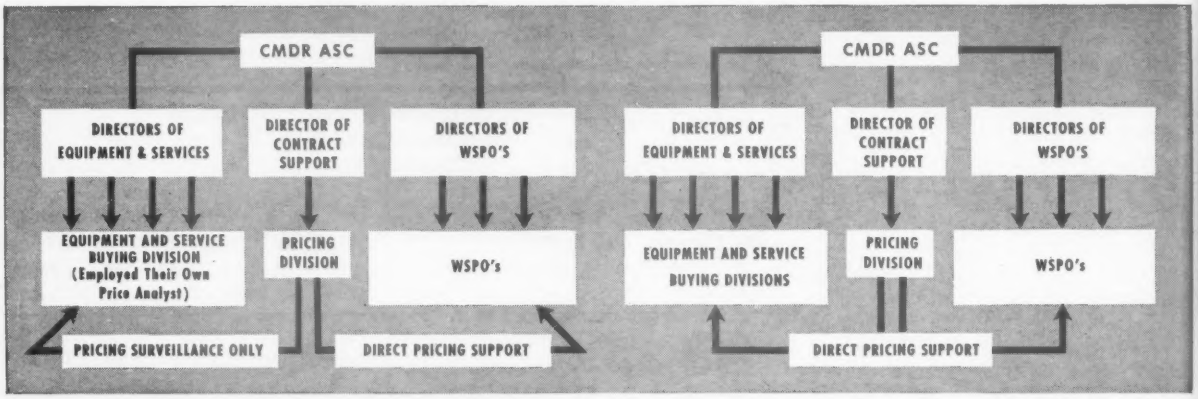
*Finally, the U.S. landing at Lebanon—a blue ribbon for quick, efficient reaction to crisis. The supply system which had taken nearly a decade to build and crank into streamlined operation had supplies on the beach literally before there were enough troops to use them.*

*Today, Com Z is out to prove a supply setup can be tightly run and economical and still respond to heavy war time requirements.*

*From its shaky beginnings, Com Z has now reached the point where it can handle $100-million a year in supplies, issue $1-million worth of stock each day, and dispose of some $400,000 in material daily. From Com Z, USAREUR can now get 85% of the repair and maintenance parts it needs—and this from an organization that processes some 50,000 supply requests a day.*

# How Do You Buy Reliability?

***In Dayton, Ohio, the Directorate of Equipment & Services at AMC's Aeronautical Systems Center faces this problem each day of the week. Given the responsibility for all of the Air Force's aeronautical electronic gear, this is the answer they have come up with.***




*BEFORE AND AFTER look at the organization chart shows more direct lines of control and surveillance under the new system.*

**by Col. John A. O'Leary**
Director Equipment & Services
Aeronautical Systems Center

TWO INDEPENDENT events shortly after the turn of the Century joined together to produce one of the greatest impacts ever made on military thinking and planning.

Number one was the Wright Brothers' first flight of powered aircraft in 1903. This machine got 10 feet off the ground and flew a distance of 120 feet at about 42 miles an hour. Today we talk quite casually of Mach 2 and 3 and altitudes of 70,000 ft. and higher.

The second was the invention of the electronic vacuum tube in 1907. While probably not as widely recognized, developments stemming from this event have had as much to do with present military capabilities as the development of flight. Without the current complex electronics systems, our military aircraft could not exist as effective military weapons.

In both defensive and offensive capabilities, we are utterly dependent upon complex mechanical and electronic systems. This equipment must not only do precisely what it is supposed to do, but do it under all military conditions at all times.

For example, consider how fighter intercept missions depend on these systems.

To put the fighter in the air at the right time calls on an extensive radar net to determine altitude, speed, direction and numbers of enemy aircraft. This intelligence must be instantaneously and continuously transmitted to a combat control center and correlated, through electronic computers, with similar intelligence from other sectors of the net.

The scramble order to the fighters must be automatically transmitted giving time, direction and course setting. In the airplane, when airborne, automatic pilot and flight controls take over, continually receiving correctional inputs, based on later radar observations.

## *Why Error Means Abort*

These automatic control and navigation systems, through airborne computers, must integrate, correlate and feed back data on air speed, altitude, ground speed, magnetic and radio compass readings, altitude of the plane and distance traveled or time. Flying at speeds from 1000 to 2000 mph, on a course calculated to intercept the attacker over the barren Canadian shield or over target-free water at ranges up to 1000 miles, the slightest error or angular deflection in course will lead to a mission abort.

Nor is this all. The fighter must carry its own radar search which comes into play near the zone of intercept. This system must take over the flight control and navigation job. At the pilot's command, the radar must lock on target and direct the fire control system for delivery of the kill. All of this must happen automatically in an extremely short period of time. There is no second guessing or equipment failure margin, if we are to kill the target.

Moreover, with the tremendous range and power of enemy weapons, a failure to intercept or destroy now entails lethal penalties unimaginably large. Whole cities and their environs—and national survival itself—are vulnerable.

This increased complexity, particularly that caused by introduction of electronics, requires more than ever before that each element of the complete weapon system be compatible with all others. To integrate all of these components and sub-systems in the air frame in a timely manner is mandatory. Many pieces of equipment that work perfectly alone need much more work to perform within the complete weapon system. We fully realize that failure of any single item to meet a development or production schedule will result in failure to deliver the entire system to an operational unit-on time.

Dependence on electronic systems

# THIS ONE COMPUTER

## will handle all four types of data processing

*COMMERCIAL • SCIENTIFIC • MILITARY • INDUSTRIAL*

The Philco 2000 Computer is the most versatile large scale data processing system available today. This one computer can handle efficiently all four major types of data processing problems, each usually requiring a different system.

The high speed input-output system updates an inventory of 500,000 items in less than 20 minutes; large complex scientific computations are now being solved in one fourth the time formerly required; and Philco 2000 Computers are now solving problems vital to the national defense effort.

The Philco 2000 is easily utilized for any of these applications. Parallel logic and asynchronous mode of operation permit expansion without costly changes in system design or existing programs. This extreme versatility is one more reason for the proven economy of the Philco 2000 . . . the computer that has changed the industry.

PHILCO CORPORATION • GOVERNMENT AND INDUSTRIAL GROUP
COMPUTER DIVISION, 3900 WELSH ROAD, WILLOW GROVE, PA.

**PHILCO 2000 DATA PROCESSING SYSTEM** World's First in All-transistor Logic and Circuitry

**PHILCO®**

*Famous for Quality the World Over*

## *De-bugging and fixit don't work . . .*

must be considered from the viewpoint of the environment in which we live. First, electronic systems have become extremely expensive. For example: A modern bombing system costs about $500,000 as compared to $8,000 for a World War II version.

Second, Air Force must live with a relatively constant budget in an era when weapon systems increase daily in cost.

Third, the luxury of first testing a system and then placing it in production is a thing of the past. In view of the amazing advances being made in the electronics field, we are for all practical purposes testing and producing simultaneously.

Fourth, the next war will be fought with what we have on-hand at the outbreak and, fifth, the decisive phase will be concluded within a short time.

Sum and substance of the above is that our weapon systems are limited, that future war requires our weapons to operate as planned at the start of war and that the success of Air Force's mission is completely dependent upon complex electronics systems. Whatever the electronic device, if it doesn't work when we need it, we can't use it.

One of the largest problems facing Air Force today is to reduce the probability of failure of electronic equipment. We must increase its reliability. This is the number one job of Air Materiel Command's Aeronautical Systems Center, and particularly its Directorate of Equipment & Services.

The Directorate of Equipment and Services comprises 543 people, about one-third of the personnel assigned to the Aeronautical Systems Center. Their primary mission is to procure government furnished aircraft equipment used by the prime aircraft manufacturer in his weapon systems. The types of equipment procured include electronic systems, propulsion systems, wheels, brakes, instruments and numerous other equipment.

In attacking the problem of reliability this directorate has followed General Warren's policy which stated simply is "Tell industry what is wanted, tell them what they have to do to prove they have met the requirement and then select a contractor who can deliver."

The old system of determining reliability as a result of in-service failure data is outmoded: it simply won't work under present conditions. We don't have the time and money to rely on this antiquated system.

Before proceeding to our methods for getting increased reliability in electronic systems we should define "reliability." Our definition is "the probability of an item performing the purpose for which it was designed for a specified period of time when used in the manner and for the purpose intended."

### *The Two Keystones*

The foundation of any reliability program is (1) an adequate design and (2) a reliability-conscious contractor with a well established reliability program. Reliability must be designed into equipment. If reliability is not inherent in the design it is difficult, if not impossible, to achieve it as the equipment evolves. "Debugging" and fixit procedures constitute a costly and inadequate method of compensating for reliability deficiences not found in the first place.

Our first step is to select a contractor who meets these qualifications. We investigate the contractor's reliability program for his concept of reliability,

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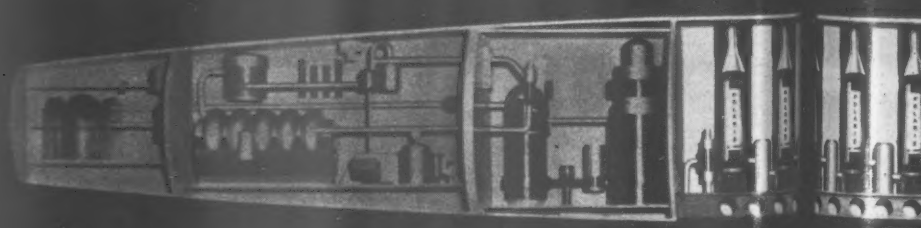
# Undersea launch pad for sixteen Polaris miss



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16 Polaris

how he is organized to do the job, his training program, his vendor relationships, etc. His design is analyzed to determine its potential to meet our reliability requirements.

Once we are convinced a contractor can meet our reliability requirements besides all other criteria, our next step is to write language into our contract that defines what is required in the way of reliability and the way the contractor will demonstrate his compliance.

Our reliability is expressed as "Mean Time Between Failure (MTBF)" over a specific number of hours. Since this MTBF is a contractural requirement that must be met during equipment production, it is a statistic that differs from minimum MTBF desired in field use.

To find the contract specified MTBF it is first necessary to define minimum acceptable equipment reliability, by percentage for actual mission performance. It may be desirable to exceed this due to maintenance and logistic problems. Once this is set and average mission time is known, we can obtain the minimum MTBF we desire in field service.

Since it is impractical to test each production item we must rely on sample tests to prove that production items meet reliability criteria. We must also determine the tolerance or variation acceptable, since no two production samples are identical. The lower tolerance limit is our minimum MTBF required in field service. Upper tolerance limit is the contract specified MTBF.

## *How Statistics Work*

By using statistical data and sampling plans developed by AGREE Task Group No. 3 we can show compliance with the contract specified MTBF with a 90% confidence level that equipment will meet the minimum field MTBF. For example, if minimum equipment field reliability of 80% is desired for fifteen hours mission time, we obtain a MTBF of 68.2 hours. If we select a contract specified MTBF of 102.3 hours, this will give us probability that equipment meeting this specification will have a field experienced MTBF over 68.2 hours 90% of the time and below that 10% of the time. If more than 90% confidence is desired it is necessary to increase test time, and therefore cost. If lower probability is desired these factors would be reduced.

Now that we have set our reliability requirement, we next specify reliability tests required to insure that it is met. There are two general types of tests, pilot production and production tests.

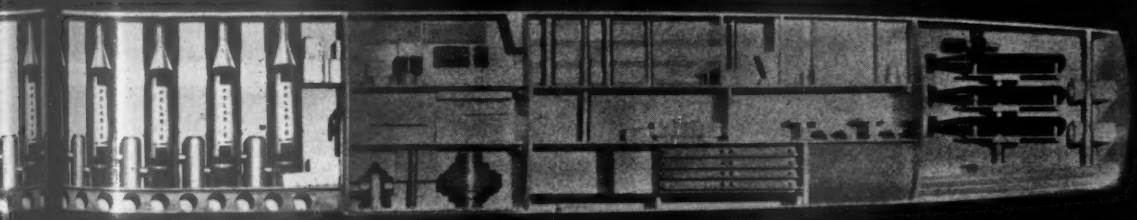
The purpose of the pilot production reliability test requirement is to provide certain data for design and evaluation purposes and to prove that the production facility can actually produce equipment that meets the contract specified MTBF.

After equipment has passed pilot production tests, the contractor gets approval to begin production. Production equipment must then pass reliability tests to insure the contract MTBF is met.

To insure tests performed simulate actual field conditions as closely as possible, our contracts include specific data on conducting tests. On-off cycling at a rate approximating service use, usage cycling (such as tuning radio equipment to various frequencies), operation nominal, maximum and minimum time voltage, temperature cycling, vibration are all typical of the various environments specified.

Although the above approach to electronic reliability is rather new, we have had a chance to see the results. We have increased reliability on several of our electronic systems by several hundred percent. But there is much yet to be done. The principles discussed here are being expanded into other areas such as engine starters and various electro-mechanical systems.


ris missiles



A U. S. Navy Polaris submarine is a self-sufficient missile base. It provides comfortable quarters for its hundred-man crew and carries supplies for several months. In its launching tubes—eight on each side, as shown in this cutaway model—will nest 16 Polaris missiles. But a Polaris sub differs from all other missile bases in one important respect: it can disappear from the face of the earth for weeks at a time. Though its position in ocean depths will be unknown, its presence will be felt. For—should America ever be attacked—each Polaris sub could launch its 16 Polaris missiles in as many minutes. Lockheed is prime contractor and system manager for the Polaris missile.

LOCKHEED MISSILES & SPACE DIVISION SUNNYVALE, CALIFORNIA

**CAPABILITIES FOR DEFENSE**

Solar Corona

# Electrifying S

If satellites and space vehicles stop "working", they are simply high cost space debris. Reliable power supplies are mandatory.

To meet this requirement, extensive Westinghouse research and development efforts are being applied to perfect reliable, compact, lightweight systems that will convert solar and nuclear energy into unfailing, long-life sources of electric power.

Westinghouse is investigating many new electrical power systems, but primary efforts are directed in six important areas. These are: 1. Thermoelectric; 2. Thermionic; 3. High-efficiency solar cells; 4. Photoemission; 5. Magnetohydrodynamic; 6. Rotating magnetic generation. This work is being performed by the Aircraft Equipment Department, Lima, Ohio, supported by the Central Research Laboratories and the Astronuclear Laboratories, Pittsburgh.

Space power requirements—in not too many years—will be measured not in watts or kilowatts, but in megawatts. This need presents formidable technical problems.

We are making progress toward their solution.

**Westinghouse**

Filamentary nebu

Moon, age 14 days
Spiral nebula in Ursa Major
Spiral nebula in Virgo
Space
Spiral nebula in Andromeda
Spiral nebulae in Canes Venatici
Filamentary nebula in Cygnus
Globular star cluster in Canes Venatici
Saturn and ring system
Head of Halley's Comet
Nebula in Sagittarius

## *Pentagon Profile*

### This Month:

# Hon. James Wakelin

***Assistant Secretary of the Navy (R&D)***

THE MOST OBVIOUS measure of the size of the job that is held down by the Hon. James H. Wakelin, Jr. is the dollar sign: Navy's fiscal 1961 research, development, test and evaluation budget has been set at $1.2 billion.

On the other hand, less obvious but perhaps more to the point is the job as described by one of Wakelin's key aides: "As Assistant Secretary of the Navy for Research and Development, Mr. Wakelin in effect has the responsibility for what the Navy's weapons and equipment will be like five or ten years from now, and as a result, what the Navy will be doing. This includes just about every area of Naval operations from flights into space to sailing under the sea.

## *What a Decision Means*

"Let me give an example in the case of, say, a major shipboard air defense weapon system. This would be used for air defense work on destroyers and cruisers. It follows then, that if we give this system the go-ahead, somebody is soon going to have to start laying destroyer and cruiser keels. These ships will then be the Navy of the future—for at least 20 years after they are launched.

"It also means that when we have the system ready to go, the procurement people are going to find money to buy it and support it, and BuPers is going to have to worry about training the people we will need to man the system. On the other side of the coin, if we should decide not to go with the system, it means that we are going to have to find something else that will do the same job—or resign ourselves to not getting the job done. Bear in mind that I am talking about a simple go-no-go decision."

Comments Wakelin himself, "To handle this kind of responsibility most effectively, you have to be able to forget about being a project manager." What he means is that when a certain level of management is reached, the individual manager must be able to work in terms of the overall program with which he is charged. He can no longer waste his time with specific technical problems of specific projects.

Again quoting one of Wakelin's aides, "You can tell by the way he works that he believes in this idea. He feels that nobody knows a given project more thoroughly than the people who work most closely with it, day by day—the project personnel in the technical bureaus. Because of this—and rightly so—he relies heavily on these people.

"I know from my own experience with Mr. Wakelin that this puts pressure on the people working under him, even though it's a healthy sort of pressure. When you turn a piece of work in to the Secretary, you have to make damn sure that it's absolutely right, for a piece of paper signed by an Assistant Secretary may have many far-reaching effects."

The management practitioner described above is 49-year-old James H. Wakelin, Jr., a man with wide and varied background for his present job. Judging by his own description of the job, it is somewhat surprising that Wakelin can maintain his relatively youthful appearance:

"As Assistant Secretary for Research and Development in the Navy, I am responsible for policy, management and control of Navy Department research, development, test and evaluation matters, including general management of the funds involved in this work. In managing Navy's R&D program, I work closely with Dr. Herbert York and the members of his staff. I also work with Dr. Courtland Perkins and Richard Morse, my counterparts in Air Force and Army, to discuss programs of mutual interest and to coordinate our efforts in R&D matters.

"I also coordinate and direct the efforts of the Navy bureaus and offices and Headquarters, Marine Corps in fulfilling RDT&E needs of Navy's operating forces."

Summing up what his job must produce, Wakelin says, "In our rapidly changing scientific and technical environment, we must pattern our program to cope with widely divergent threats in the future. With the present rate of progress in science and technology a vigorous and diversified research and development program is essential to insure that the required weapons will be available to the Navy of the future."

The man who must see that the foregoing job is done has brought to it education and experience that can only be described as wide and varied. From public schools in his native Massachusetts, Wakelin in rapid succession got a B.A. from Dartmouth in physics, another B.A. from Cambridge University in England, an M.A. from the same school, and a Ph.D. in physics from Yale.

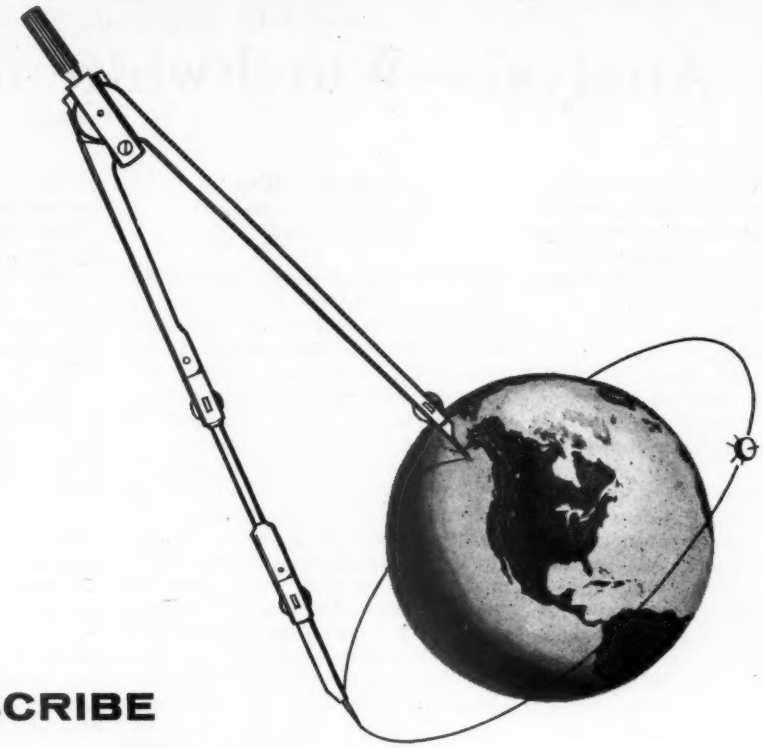
Then began a business career covering just about every area of research management that could be imagined. Wakelin worked with such firms as B. F. Goodrich, General Electric, Stanford Research Institute, and the Textile Research Institute at Princeton University, where he was Director of Research. Much of this work was done in connection with Engineering Research Associates, Inc., which he helped to found, and his own consulting firm on research planning and organization.

## *Background for the Job*

During this time, Wakelin managed to put in time as Ordnance Staff officer to the Coordinator of Research and Development, Department of the Navy (1943-45), and from then until 1946, as a Lt. Commander, he headed the Chemistry, Mathematics, and Mechanics and Materials Sections of the Planning Division, Office of Research and Inventions. He was also active in planning and organizing Navy's program to sponsor basic research, now under ONR.

With this background, it seems only logical that Dr. Wakelin should be in the driver's seat on implementing the research and development portions of last year's Franke Board report on Navy organization. Nor is it surprising that this reorganization has moved smoothly, with virtually no effect on Navy's many regular responsibilities.

Perhaps the best summation of how well the reorganization has progressed is offered indirectly by Wakelin himself, in testifying before the Senate Defense Appropriations Subcommittee: "The fiscal year 1961 Research, Development, Test and Evaluation program in this budget request is based on a careful analysis of the operational requirements of the Navy. It will provide a balanced, integrated and continuing program which represents the most carefully planned effort, consistent with the budgetary limits and national policy."



# HOW TO SCRIBE A "PERFECT" CIRCLE IN OUTER SPACE

## Bell Telephone Laboratories guidance system achieves unprecedented accuracy in steering Tiros weather satellite into orbit

Equipped with TV cameras, tape recorders, solar cells and antennas, the world's most advanced weather satellite, the NASA Tiros I, had to be placed in a precisely circular orbit at a specified altitude to do its job well.

The "shot" was a virtual bull's-eye. The mean altitude was within *one mile* of that planned. And the deviation from this mean was less than ½ per cent, making it the most-nearly-perfect circular orbit ever achieved with a space vehicle by either the United States or Russia.

Two Bell Laboratories engineers, T. J. Grieser and D. R. Hagner, look over the second-stage section of the Air Force Thor-Able missile used to launch the NASA Tiros weather satellite.

The dependability and accuracy of Bell Telephone Laboratories' ground-controlled Command Guidance System have been proved before—in the successful tests of the Air Force Titan intercontinental ballistic missile, and in last year's Air Force Thor-Able re-entry test shots from which the first nose-cone recoveries were made at ICBM distance. Now, with Tiros, the system contributes to a dramatic *non*-military project. Other uses are in the offing.

This achievement in precise guidance again illustrates the versatility of Bell Laboratories' research and development capabilities—directed primarily toward improving your Bell telephone service.

**BELL TELEPHONE SYSTEM**

# Value Analysis—Worthwhile or Waste?

MR. GARONO'S comments represent the views of many responsible people whose understanding and whose decisions decrease or increase the amount of armament which the Nation secures per billion dollars.

What we do not understand, we ignore or discredit.

Mr. Garono—and others he typifies—seeks truth. In speaking out beliefs which many others share, he has hastened the day of truth and understanding.

A few years ago, I shared Mr. Garono's belief. I felt that, if we could continually increase engineering competence and, at the same time, increase the reliability and adequacy of information at their finger tips by improving the guides, aids and tools which help them in their design and development work, most non-contributing costs would be prevented or eliminated. It took overwhelming proof to force a change in that viewpoint.

The first shock came when the newly grouped value engineering techniques were first used on a highly competitive consumer-type product. Engineers, oriented toward special ideas, special materials, and special processes for high quality at low cost, had designed and developed it. During three years of production, special engineering, manufacturing and purchasing penetration had cut 10% of cost.

Then two men were assigned to use special value techniques on it. Their work identified another 25% of the cost as contributing neither to performance, safety, life, nor to any attractiveness or features desired by the customer. This re-kindled design work, now aided by value consultation. Within a year, a product was provided at half the original cost, containing all original performance and features. It was simpler, more reliable, and, surprisingly contained no materials or technology unavailable five years earlier.

Still, this could be "chance." Anything can happen once.

Next, an industrial product used in yearly quantities of a few thousand and made on a job shop basis was selected. It had been in production several years. Design engineering, manufacturing engineering, and purchasing men, in a depth study, had just completed modifications, changes and re-designs which showed 40% of present costs to be non-contributing.

They eliminated this. The product was ready for factory tooling. Three

by L. D. Miles
Manager—Value Service
General Electric Co.

men, trained in value engineering techniques, applied them to the product. It was startling to find that 60% of remaining cost was identified as unnecessary. The simpler, more reliable and lower-cost alternative means for accomplishing the functions also improved appearance and customer features.

But how could these techniques apply to military products, where unknowns in performance must be pierced with every new design; where the big question in development often is if the product will perform its function at all; and where, due to short time, we must go into production with the first apparently practical solution?

To find out, a military product was chosen which had been in manufacture a year. Problems, costs and other valuable information were known; still the design was current. The function evaluation techniques were used on each assembly, sub-assembly, and component. It was found that individual functions could usually be done for between one-half and one-tenth of the cost.

Functions costing—$127 for $32; $20 for $8; $4.50 for $.50, etc.

Conclusive proof. More studies followed—with similar results.

## *Embarrassing Audits*

Value techniques developed by private industry under pressures of competitive markets produced similar results in the military. But how could they be applied? When? And by whom?

These "Value Audits" were embarrassing to engineering and manufacturing people who had done their best "the first time." They wanted better value the first time, not embarrassment from better answers after the drawings and plans were complete.

From this need, the value specialist was born. He is a trained and experienced engineer. He is further trained in the special value analysis and value engineering techniques. He accumulates vast specialized knowledge vital to his profession. When invited at the proper time and to the proper extent into the research—development—design—manufacturing—cycle, he contributes tangible, usable knowledge which shortens engineering time, provides simpler, lower cost, more reliable solutions which in military work decrease product cost by one-half to two-thirds.

Since his use is change—his benefits must be learned. Perhaps a few parallels will help.

A few decades ago, tax reports for most companies were made out by the general accountant. He had many other duties. It was a part of accounting training to provide to all accountants enough information on tax practice so that any of them could appropriately prepare the tax statement. This was when the significance of taxes was like a wide variety of other expenses.

But, as taxes increased, the need for a higher degree of excellence in preparing tax statements increased. During the transition period, accounting managers felt they could increase the tax content in regular accounting courses and qualify any good accountant to prepare a good tax statement. Later, they saw that because of special techniques, knowledge and experience needed to hold down unnecessary taxes, this plan was costly, inefficient and ineffective. Tax consultants were specially trained and used.

Parellels exist in most fields of engineering. Designing jet engines, for instance, wouldn't be considered without design engineer using the services of specialists in high-temperature metals, bearings, special lubricants, etc.

In this country today, we are in the transition stage value-wise. The degree of value secured by previous systems is often being found unacceptable. New developments are forcing improved value in the military. Attaining value is now a specialized field. Competent value engineers and consultants are required to minimize needless costs, just as tax specialists are needed to minimize unnecessary taxes.

During this transition, vastly better value in military gear is changing from something *desirable* to something *absolutely vital.*

Innovation is necessary. Something better is required. In this type of situation, experience is often a deceitful guide. "Experience teaches us how to solve yesterday's problems." But—today *—we don't have yesterday's problems.*

Industry and government has learned how to use consultants—the tax consultant, the metallurgist, the computer specialist, etc. They will soon learn how to use the value consultant. The United States, then, will receive at least twice as much armament for its defense expenditures.

# *Two sides of the coin on what has been variously termed Payroll or Payoff Engineering— It depends on your point of view . . .*

**by Louis E. Garono**
**Chief Engineer**
**U.S. Army Chemical Corps**
**Engineering Command**

I AM EXTREMELY interested in Mr. Miles' objective approach and his basic theme, that of seeking truth. I hope, and I am sure, that this airing of opinions and positions will hasten the day of truth and understanding.

I sincerely believe that while both of our positions have elements of truth, the truth that I am seeking is fundamental rather than expedient.

When the recriminations have subsided, and I hope they have in this search, I think there will shake out several key facts which we all must recognize. In substantiation of the value engineer's position, I think one of these sets of facts which we must admit to concerns itself with the recognition that the result of any engineering design can always be improved.

Mr. Miles cites instances of major improvement which I do not doubt took place. My criticism of the value engineering field is not that these cost improvements should not be made but that they should be made during design or certainly no later than design check-out in a mass production environment.

Another truth that Mr. Miles and his associates recognize, as do I, is that the increasing complexity of our technology necessitates the use of specialists or consultants, as he calls them. Mr. Miles brings out that engineers must use high temperature specialists and all sorts of other highly specialized people in fields of design and that, as he goes on to develop, the value specialist is in this category.

I agree that value is a very important part of an engineering job, and I will also agree that in certain applications, value knowledge may be highly specialized and consultants required by the primary design or product engineer. I leave Mr. Miles at this point and, at the risk of being called unfair, feel that his argument for the use of specialist consultants substantiates my position.

The key is the word "consultant" which means to me that the primary design or product engineer is asking specialist advice as he does in the other technological fields and takes it or leaves it as he sees fit, the point being that the prime decision belongs to the man best able to make it the primary risk-taking, decision-making, design or product engineer.

This man is the only man equipped, or who should be equipped properly, with cost versus function in all of its ramifications. Decisions based on cost alone obviously would be inappropriate. Decisions on cost integrated into the other engineering aspects are engineering decisions and this integration can only be performed in a knowledgeable manner by a person or group with a complete understanding of the development and product engineering and the other stumbling blocks along the way.

If the man making value decisions is this well equipped, we have duplicate competence. If he is not this well equipped, it's proper for him to advise someone who is equipped but not to make primary decisions.

I think I have belabored the subject sufficiently to be in a position to summarize. I agree with Mr. Miles and the value engineers that value is a consideration. I will even go so far as to agree that, in some instances, value might be an appropriate consulting or advisory function.

As a fundamentalist, however, I refuse to be convinced, and have not seen any plausible argument which will convince me that value considerations after the fact by specialists without the rounded out background of the responsible design or product engineer are desirable or even proper. If this after-the-fact value consideration is rounded out by complete engineering knowledge, I can see nothing but duplication.

I can think of no answer to this problem other than that it lies in the lap of the manager, not the engineer.

If the manager sanctions an environment where after-the-fact inadequate or duplicative value decisions are being made, I think he is a bad manager. If he sanctions an environment which will permit what is called an engineering job before the fact without value considerations thus leaving room for these considerations later, I think he is a bad manager.

I refuse to believe that there is any room for a field of value engineering or value analysis other than as a specialist consultant to the prime decision-making engineer. If the value engineers will admit that this is a proper dimension for their field as advisors to the primary engineer, I will welcome them to the fold and believe that good management will make a place for them and use them.

Beyond this, I feel the managers are permitting unhealthy expedients to develop which could become Frankensteins and destroy them and their organizations.

My beliefs in this area of fundamental engineering are also extended to the many other fringe specialties equally necessary to a good engineering job such as quality engineering, inspection engineering, reliability engineering, human engineering, etc. The manager's problem is the same in all these fields and I believe strongly he must recognize them and take steps to control the cancerous growth of these fringes.

***(Besides Mr. Miles' reply, we feel the following excerpts from a letter by James L. Schuler, Assistant for Naval Architecture, Office of Value Engineering, Bureau of Ships represents a good sized segment of opinion on Value Engineering in the services.)***

Mr. Garono . . . (has) expressed doubts about the need for Value Engineering. His doubts have led him to make some criticisms which have been made before. These criticisms can be answered by repeating some of the basic concepts on which a Value Engineering program is based . . . Successful cost reduction depends on emphasis and re-emphasis. It also depends on developing attitudes based on understanding the urgent need for action to cut cost . . .

A review may be a healthy thing . . . Value Engineering studies help save the dollars that are lost in the cracks between the organization chart . . . Value Engineering is needed in every place where competition, based on cost, exists.

The Value Engineer states and restates that the credit (for money saved) belongs to the man who makes the decision. That man is the line engineer. He takes and keeps the responsibility. He deserves and gets the credit.

I'm sure we are all in favor of cost reduction. Value Engineering is not the *only* way. It may not be the best way. But it is a proven technique. In the hands of skilled management it can do a good job. If the tool fails, don't curse the tool—use it properly.

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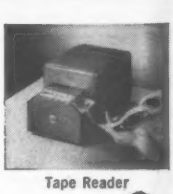

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# Information Security:

# *What Are We Trying to Protect?*

***ONE ARMY GENERAL has estimated that only about 10% of the information now stored in classified military files deserves to be there, that the other 90% is there for a good many reasons which have nothing to do with being "of aid and comfort to the enemy." At a time when defense is disseminating, in peacetime, more information than it ever has before to both private industry and our foreign allies, this widespread lack of logical approach to information security is creating nagging and expensive managerial headaches. Chief reason: Improper or inadequate attention to putting the stamp on in the first place . . .***

SAFEGUARDING classified information is a several-million-dollar-a-year business. In fact, no one man really knows just how much the Nation pays each year to protect our Defense "know-how."

The security business is, too, a business defined by, and existing almost solely because of, mental attitudes. Its goal, obviously: keeping potential enemies as ignorant as possible. If there were no classification categories, no concepts of what knowledge each should house, there would be no security business.

Industry's definition of industrial security is a good deal broader than the Defense Department's, includes prevention of sabotage, thievery, fires and "safeguarding and securing employees, property and other corporate interests." Defense holds their definition to safeguarding of classified information and material.

But, too often, men mesmerized by the system and only vaguely aware of the philosophy guard information—even though *it is not really a secret from anybody except the vast bulk of the American people who are most vitally affected by it.* And with the greatly increased dissemination of information today through the Military Assistance Program and other international channels to foreign nations and to industry through weapon systems development programs, this unnecessary fence around knowledge slows progress, adds administrative burden, runs up costs.

By contrast, one man, with authority and an understanding of *national* security, managed by exercising common-sense judgment born of heavy experience to: save over two million dollars by downgrading the tech orders on the Thor missile in England; took a field trip (cost $19.75 plus travel), declassified J85 jet engine parts, saved over $100,000 per year in security costs; saved an estimated $635,000 in phase down of overseas supply bases by declassifying parts (which by themselves wouldn't mean too much to an enemy agent anyway) making it possible to use indigenous help overseas to repair equipment with approximate savings of $635,000 to the Air Force.

Spurred by a strong interest and attention from Air Force Deputy Chief of Staff for Materiel, Lt. Gen. Mark E. Bradley, Jr., Air Force Industrial Security people appear to be far ahead of the rest of the security field in relating national security, practically speaking, to the classification and handling of information.

## *What Logic Can Mean*

Another, and almost continuing, example of logic: for international programming, to get the most out of it, there must be wide dissemination of information. To this same common sense man, this is grounds enough to consider downgrading or de-classification.

This "safeguarding" has frequently created some ridiculous ramifications. Among them: It takes a pass to buy a candy bar in the Central Intelligence Agency snack shop. Also much information which has already been made public in published Congressional testimony still cannot be discussed freely by many branches of the military service because "nobody top-side has given us any authority to de-classify it, yet."

Security review offices have deleted statements from a manuscript (sent them for clearance) on the grounds that they are contrary to "policy"—which has never really been defined and is frequently a somewhat nebulous thing at best. Thus as has happened, what might be a direct quote from an official Defense Department release several months ago may no longer be an acceptable thing to say today. And all of this beating through the underbrush has nothing to do with protecting classified information at all.

Too often, classified (erroneously) information has been parcelled to the public as a help in selling programs. Frequently, as well, military offices have been accused of keeping four security stamps in a desk drawer: "Secret," "Top Secret," "Confidential," and "Politically Inexpedient."

Generally, however, in spite of these occasional dabblings in something besides security—attempts to cover mistakes and the like—practices in handling classified information, while somewhat different in all three services, are generally consistent with both Defense Department guidelines and the Industrial Security Manual.

The reason industrial security costs a good deal more than it should, results in a lot of managerial headaches and information-access roadblocks, is the lack of proper attention to classifying information in the first place, called the "backbone of the job" by one key industrial security officer.

"The problem of proper classification," says Electric Boat's Security Director Eric Barr, "is that too many

# *Why There's a Long Way to Go . . .*

people can put a stamp on a document and (1) they fail to realize the burden they are putting on the system; (2) don't understand the proper criteria for using the stamp."

He adds what, compared to current practices, might be considered heresy in some circles: "the philosophy should be when in doubt about how to classify a document, don't classify it at all—or if that is a little bit too cavalier, find out before the stamp goes on."

Although there has been headway in attempts to spread this philosophy through not only the military establishment but also industry, there is still a long way to go. One outfit, the American Society for Industrial Security, of which Barr is president, has even gone so far as to propose that all defense security matters should be centralized in one office.

They could well be taking their lead, at least in part, from the success of the Air Force industrial security management effort regarding classification of technical developments, headed by Joseph J. Liebling, Assistant for Security to both Air Force Deputy Chief of Staff for Materiel and for Development.

## *The Real Weakness*

This office recognizes, as do a good many other industrial security officers, that weakness in the system as run today is in the classification area.

Says Liebling, "the key man is the one who controls the classification in the first place." In setting policy his office asks itself each time a question comes up, basically, "what are we really trying to protect?" Their goal at the policy level: disseminate into the field (which has the ultimate classification responsibility) the guide line that to classify or not to classify, to declassify or let alone, should be considered from the national security point of view, not from the narrow confines of what the security classification process itself dictates. One result obviously: if classified information has been let go in official public statements, even though security classification paperwork has not caught up with the fact, military officers and plant representatives in the field need no longer act as though they are ignorant of the whole thing.

To combat the problem of the man in security who will not de-classify information, because no one has told him *officially* that it was de-classified, Air Force Information and Security people set up a one-page standard form letter which they use as almost automatic notification. It invariably triggers a whole chain reaction in the field. But, to illustrate how far this philosophy of looking at security from the national rather than the procedural point of view has to go, it took a year and a half to sell that "form letter" idea at top levels.

One more success under this broad philosophy approach has been a change in the security requirements check list. Presumably, if the system is working correctly, whether to classify information or not is determined on the basis of a check on the information itself, not the documents in which it appears. In other words, says Liebling, "We don't classify a book anymore, just because it's a book." This represents a new approach for the Defense Department.

## *Reason for Success*

Much of Air Force success so far in the business has been because Air Force has an organization on the Air Staff level which straddles the entire research-development-production cycle. This approach is unique to the Air Force. It means less personnel, less operating cost, a higher authority to come up with findings—and therefore better, more logical results.

Air Force aim, from major command level down: make the project officer who sets security, the security man who protects it, and the contracting officer who approves what the other two do, operate as a three-man team.

Delegating actual day-to-day handling of this security business into the field was begun in mid-'58, which has permitted some remarkable strides in the business but has also created tremendous problems. One headache: this great decentralization demands that the men in the field accept delegated authority, use sound judgment and *not* "stamp it if you don't know."

Another roadblock: the tendency to classify hardware. Comments Liebling, "Know how and technological advancement are the important things, not the fact that you have a piece of hardware."

Defense Department is in the process of modifying its classification guides right now, a modification which may provide even greater benefits to the intelligent handling of information.

Said one officer of the classification business, "it must develop from a whole spectrum of knowledge—intelligence, plans, international programming, status of a program (R&D or production), cost (is classifying worth the price), administration, personnel." In effect, people in security must be well-oriented diagnosticians.

Example: available intelligence about Soviet missile capability leads many common sense people in the business to believe it is pointless to retain a high degree of classification on certain thrusts of engines, for instance. "What can we tell them that they don't already know."

Another: "We've about run out of radical external designs for missiles from a technological standpoint. Is it worth the cost to hide the external configuration of a missile before rollout—even when the net result will look a lot like some missile we already have and is not going to aid the Russians at all anyway?"

That technical security factors cost a large pile of change, probably more than they should, is unquestioned. That technical security factors can delay or hurt the success of an operational mission by any service has also happened.

By delegating authority and certain operational functions to the field, Air Force at staff level believes (and can back it up with specific case history reviews) that they have achieved inestimatable savings and the elimination of unnecessary operational administrative difficulties, i.e., in security classification and de-classification of ballistic missiles, tech orders, requirements for classified off-shore procurement contracting because of overseas depot phase down, extensive programs in the public release of Air Force information, etc.

## *What is the Key?*

They expect the trend to continue and savings to increase because of not only diminished security costs but also a whacking away at impractical requirements. Says Liebling, "The key to our success will be how much of this philosophy is followed up in the field."

To a larger extent, the key to more efficient and effective handling of the information classifying process will depend largely on whether this philosophy is bought by the other services as well—where there is no managerial advantage of centralized policy control even approaching the one Air Force has bestowed upon its top security office.

And in dollar savings alone ($20 a cubic foot to store secret documents vs. $3.10 for unclassified material) there is a growing Pentagon conviction that this cloak of classification needs continuous new looks.

# Research Rundown

**ANTI-SUBMARINE WARFARE IS MOVING TO THE FORE AGAIN,** following a more or less cyclical fashion as has been true in the past. Spurred by National Security Industrial Association Report, announcements pertaining to ASROC, Mk. 44 torpedo, work in this area is apparently taking on a rosy hue—at least according to the press releases.

**GIVEN NSIA'S ASW REPORT AT FACE VALUE, QUESTIONS STILL REMAIN** regarding how well overall ASW effort is progressing. Report contends that gains have been made in the past on ASW, but point to such basic future needs as a central point of information for Industry/Navy researchers.

**TAKING ASROC AS A TECHNICAL ASW CASE-IN-POINT,** it is worth noting that the much-praised missile has been in the development mill since 1954, has only recently gone operational, still needs " a few adjustments." Measured against, for instance, Hound Dog, hardly a crash program. On top of which finished copies of the weapon will run about $22,000 each, in the words of one officer "like driving a Rolls-Royce off the fantail every time we fire one."

**PERHAPS THE SADDEST OVERALL COMMENT ON ASW** reflects not so much on the Navy as it does slightly higher up the chain of command: Navy's original request for anti-submarine warfare research, development, test and evaluation funds was for $180-million. Slashed from that request for being "non-priority items" were various programs adding up to $133 million—almost a 50-50 split. On the total ASW program, request totalled $1.3-billion, non-priority items over half a billion dollars.

**RE-WRITE OF RESEARCH COST ALLOWANCE REGULATION** contained in a recent Defense Instruction will help clear up Section XV of ASPR. Specifically, the new instruction will provide a method for negotiating reasonable cost allowances for independent R&D for more than one military department, set up an Armed Service Research Specialists Committee to review contracts in setting such allowances, and assign responsibility to a single military service in conducting negotiations where research for more than one service is involved.

**HEAVY NEED FOR MORE AND MORE TECHNICAL PERSONNEL** was underscored recently by Lt. Gen. T. H. Landon, AF DCS/Pers. Citing the electronics area, Landon said that in the AF Directorate of Communications/Electronics (totalling 1.1 million people), total strength has dropped 180,000 since 1950, but technical personnel have increased by 36,000. To meet future needs, Landon said, AF will double the number of people given scientific and engineering training at Air Force Institute of Technology.

**SUPPORT FOR THE B-70 CONTINUES TO GROW,** with Lyndon Johnson's Senate Preparedness Investigating Subcommittee latest to climb on the band wagon. The report pointed out that without the B-70 "there will be no replacement for the B-52 at the time at which it enters its period of obsolescence." Footnote: other sources are boosting the B-70 as the logical answer to the end of U-2 flights, using the chemically-powered plane for the same mission without having to rely on foreign bases.



## Undersea Fuel Cache

## Product Improvement Under Study at AMC

Representatives of Air Materiel Command's Directorate of Maintenance Engineering are working with other major commands to set up a Product Improvement Training Course.

Purpose of the course, to begin this month, is to train personnel at Air Force bases in proper report writing methods concerning Air Force Materiel deficiencies.

Timely, accurate reporting of the deficiencies at base level is important in preventing accidents and improving Air Force equipment quality. A quota of almost a thousand students representing most major Air Force commands has been set initially for the course. AMC's quota is 234 students.

Work at AMC on the new course was handled by the Maintenance Systems Division of the Directorate of Maintenance Engineering. Course details were developed by Karl H. Meuche in the Division's Analysis Systems Branch.

## New Filing System Ups Army Production

Vastly improved production and efficiency through savings in time, space, money and manpower have resulted from replacing old drawer filing methods with a new filing system at U.S. Army Transportation Materiel Command.

New system hinges around Diebold Super Elevator Files. Aim in installing nine of these units was to speed cataloging a multitude of aircraft parts.

Supervisory personnel at the command report better control over aircraft part numbers because each file is assigned to one operator. Desired records can be brought to the operator's fingertips in a matter of seconds.

## Overhaul Programs To Be Specified

Funds for military aircraft overhaul programs will be thrown into sharper relief when planned changes are made in budget account structures, Deputy Defense Department Comptroller Harold R. Logan has indicated.

The changes will be made in operations and maintenance appropriations requests. One change, expected to lead to better identification of these programs in the budget, would specifically detail amounts destined for overhaul of aircraft, missiles and ships.

Aircraft program breakdowns, Logan said, would be supplied separately to the Appropriations Committees upon request as in the past. Breakdowns in funds programmed for civilian and military overhaul would also be supplied in this manner. Defense also indicated it is preparing a new directive to outline a clear policy on the use of commercial overhaul facilities.

## Buying Practice Report Due From Senate Group

A special Senate Armed Services Procurement Subcommittee is expected to file its report on Pentagon buying practices when Congress reconvenes this month.

A draft copy has been printed and will be submitted for approval of the subcommittee headed by Sen. Strom Thurmond (D-S.C.). The report is expected to be less critical than the one filed recently by a companion subcommittee chaired by Rep. Carl Vinson (D-Ga.).

Congress last year ordered a joint study of procurement by the Armed Services Committees and instructed the joint committee on taxation and revenue to conduct a parallel probe of the Renegotiation Act. The tax unit's report isn't due until next March.

Informed Congressional sources have said they do not expect Senate investigators to make any recommendation affecting the Renegotiation Act. The House unit strongly recommended continuation of the Renegotiation Act on a permanent basis. Senators apparently have adopted the view that renegotiation is under jurisdiction of the tax writing committee in the Senate.

The Vinson report rapped the Pentagon's use of incentive contracting and what it said was excessive reliance on negotiated procurement. Subsequently, the House passed the Vinson bill to set new criteria for the use of incentive contracts, to encourage the wider use of advertised bidding and to open up negotiated contracting to all responsible offerors.

Senate investigators will probably discuss elements of the House bill in their report but are not expected to recommend its passage as is. Particularly, there is not nearly the concern over the use of incentive contracting as was displayed by Vinson.

The long pending Saltonstall Bill (S. 500) to legalize weapon system contracting may figure in the report, but the Senate unit, perhaps by an act of omission, is expected to conclude—as has the House group unofficially—that Defense has executive authority to contract by the weapons manager technique.

## Italian F-104 Subs Set Under License

Six Italian companies will be major contractors in the projected program under which Lockheed F-104s will be license-built in Italy for the Italian Air Force.

Assembly of the approximately 300 aircraft under the agreement will be handled by Fiat. Major airframe subcontractors will be, Piaggio, SIAI-Marchetti, Macchi and Aerfer. Alfa-Romeo rather than Fiat seems most likely to produce the General Electric J79 engines for the planes.

In another U.S./Italian agreement, Raytheon is investing $3-million to provide 40% of the capital of a new Italian missile company, Selenia. Italian government-owned Finmeccanica will provide an additional 40%, with the remaining 20% most likely to come from Edison.

The new company will use two existing plants—Microlambda in Fusaro near Naples, and a facility operated by Sindel (a member of the Edison Group) in Rome.

## Super-Titan ICBM Successfully Tested

Successful full-scale developmental model test firings of the rocket engines and storable fuels for the Air Force's newly-announced Titan II have been successfully run by Aerojet-General Corp.

The storable propellants will give the big missiles near instant readiness, while the new engines are aimed to provide much greater reliability through simplicity. Aerojet is first and second stage rocket contractor on the Titan I.

According to Aerojet, the completion of the feasibility program on the Titan marks "a major step forward" in the field of liquid rocket propulsion.

Besides the foregoing advantages in the Titan II, Air Force has said it is also looking for (1) larger payload capability, (2) reactions times reduced from about 15 minutes to mere seconds, (3) direct firing from underground silos, (4) self-contained, inertial unjammable guidance, and (5) capability of firing the missiles in salvo.

## Undersea Fuel Cache Is Tested By Navy

Navy has begun tests on an undersea liquid storage system developed by United States Rubber Co.

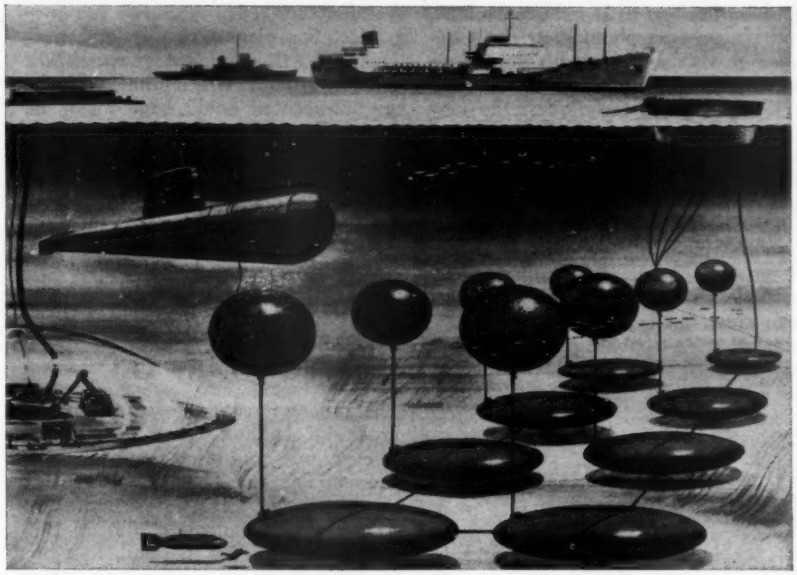
Goal of the program would be to have undersea "gas stations" spotted around the world to provide Navy's ships with fuel, water or other liquids. Seaplanes, surface craft, and submarines could draw from such gas stations with equal ease.

Prototype fuel tank holds 1200 barrels of liquid, but is considered by Navy to represent "only a segment" of eventual undersea fueling systems.

The rubber prototype will be submerged in about 52 ft. of water under the Gulf of Mexico. It is 22 ft. wide, 70 ft. long. When filled it becomes 20 ft. in width, and 68 ft. in depth.

The prototype can receive and discharge liquids and can be joined with similar containers. It is held to the ocean floor by a tubular steel frame and nylon harness forming a rig over 80 ft. long and 33 ft. wide.

Interested agent within the Navy is Bureau of Supplies and Accounts. Work is being done under ONR contract.



**UNDERWATER FUEL STORAGE tanks, as they appear in this artists conception, would greatly extend the range and endurance of today's surface and underwater fleets. Tests now being run in the Gulf of Mexico aim to prove the technique's feasibility.**

## Polaris Problems Discussed By Jaap

The tremendously complex and difficult guidance problems involved in getting a Polaris missile on target were recently discussed by Rear Adm. J. A. Jaap, Navy's Director of Development Programs.

Speaking to the Institute of Navigation at the Air Force Academy, Jaap said a Polaris missile traveling only 5 feet per second faster or slower than its prescribed velocity at the time of warhead separation will miss its target by about one nautical mile.

"The all-inertial guidance package that steers Polaris must do so with almost uncanny precision," Jaap said. "Although velocity errors are most critical, errors in position are also important. For a one foot error in altitude, the error at impact should be about one foot, and a lateral error of one foot should produce an error at impact roughly 15 times as much.

"To get a good feel for the precision required, we must remember that this five feet per second speed error and this one foot vertical or lateral error we were discussing occurs at a point about 100 miles down range in a 1200-mile range missile, traveling 14,000 kts. at this point—at an altitude of some 70 miles—and still climbing.

"Our missile's 'navigator' must be precise enough to avoid even these small deviations. At the time of warhead separation—or at the end of the toss—the warhead is only about one-sixteenth of its way to the target."

Jaap also mentioned errors in the position of the firing submarine. These he said, were not critical if they could be compensated for promptly. Of great help in this, Jaap said, should be the precise navigational fix that will be provided by Navy's Transit satellite program. Ultimate goal here is one-tenth of a mile accuracy.

## 5-Nation Space Range Under Consideration

Woomera—the Australian Cape Canaveral—may become a 5-power space research range, with Britain, U.S., France, West Germany and Australia participating.

Beyond these five, other British Commonwealth nations may be included at a later date. As now planned, the program will include launching of space satellites and deep space probes from the Australian range.

Regardless of the foregoing, Woomera will be made available if needed for testing the Sky Bolt ballistic missile. This weapon will replace the cancelled British Blue Streak as a major deterrent nuclear tipped ballistic missile in the British arsenal.

Woomera is the only Free World weapons range which can provide a land-based testing distance of 1000 miles—corresponding with proposed range of the Sky Bolt.

## Better Mathematics Needed, Trudeau Says

U.S. weapon designers have been urged to make better use of mathematics—a field in which U.S.S.R. has often outperformed Americans.

Calling for this, and asking for better liaison between mathematicians and engineers was Lt. Gen. Arthur G. Trudeau, Army Chief of Research and Development.

Trudeau said "It is highly probable that the Russian success in missiles and satellites is substantially due to the importance the Reds have placed on differential equations during the last 50 years. Apparently Soviet engineers are even aware of techniques for the study of behavior and stability of nonlinear systems, not yet fully understood by American engineers.

"American mathematicians have too often made themselves inaccessible to the people who must apply their science. Engineers on their part have overdone trial and error techniques and neglected careful theory and design in favor of generous safety factors," Trudeau said.

## New Combat Radar Announced By Army

A new portable battlefield radar system designed to look far behind enemy lines and provide photographic plots of battle information has been developed for the Army.

The new radar will sweep enemy

held territory in a 25-mile semi-circle, and by periodic photo plots, help determine whether enemy buildup or attack is in the offing.

Using doppler techniques, the new radar will also detect deployment and patterns of movement and provide widespread, accurate detection of enemy movement.

Designated AN/TPD-2, the entire system, including antenna, weighs about 600 lbs. It is helicopter transportable and is operated by a three-man crew.

In addition to photo plots, faster but less accurate locating and tracking can be done aurally.

## Atlas To Take Over As Nike-Zeus Target

Atlas intercontinental ballistic missiles will replace Jupiter intermediate ballistic missiles as potential targets for Army's Nike-Zeus anti-missile system.

Under the projected test program, Atlases will be fired from Vandenberg AFB over the Pacific, while Zeus intercept operations will center at Kwajalein Island—about 4800 miles from Vandenberg.

Tentative plans now call for buying about 18 Atlases for this purpose. The reliability with which these missiles are intercepted could have major influence on go ahead decisions for Zeus production.

Decision to switch to Atlas was made on the recommendation of Defense Director of Research and Engineering Dr. Herbert York.

## New Alloy Process Found by ONR, AEC

A process creating new metallic alloys, and holding broad implications in electronics and other fields has been successfully tested under laboratory conditions, Navy has announced.

The new, abnormal alloys are produced to date only in small, thin bits of foil, but such foil could be used in fields—such as electronics—where only small amounts of material are needed. The process, developed under direction of Dr. Pol Duwez at California Institute of Technology, was financed under a joint Atomic Energy Commission/Office of Naval Research contract.

Familiarly called 'splat cooling,' the process involves blasting a molten droplet of a pure metal or alloy against the rim of a refrigerated metal wheel spinning at high speed. This cools the droplet at 2-million°F per second, quick freezing the droplet as a small piece of thin foil before the atoms have time to realign themselves.

According to Dr. Duwez, the two-fold purpose of the technique is to (1) synthesize new alloys to gain insight into fundamental theory of their formation, and (2) to fabricate alloys of predetermined and interesting properties.

## Engineers Develop New Tilt-Bed Trailer

An expansible tilt-bed trailer, using a split axle design, has been developed by Army Engineer Research and Development Laboratories in Fort Belvoir.

The air-droppable unit will carry various equipment of different widths, and can be contracted for air transport. Its split axle is said to be the first successful use of this type design in a tilt-bed trailer.

The pilot model has successfully undergone engineering tests. This pilot was designed to carry an 8-ton pay-


# New GV-1 tanker delivers jet fuel for the United States Marines

load with a unit weight of 6500 lbs. It is 98 inches wide in its normal or retracted state, but can be expanded to 120 inches. Available equipment can be used to expand the trailer.

With dual ramps that tilt 15 degrees, the trailer can transport tracked and rubber-tired engineer airborne equipment at military convoy speeds on secondary roads when towed by a standard 5-ton military truck.

For cross-country work at reduced speeds, it is towed by the truck or a rubber-tired construction type tractor.

## Industry Developments

### GE, Nord-Aviation Set SS-10 Agreement

General Electric Co. and Nord-Aviation of France have signed an agreement which will give GE the right to build the Nord-developed SS-10 and SS-11 wire guided anti-tank missiles in the United States.

The 10-year agreement provides that General Electric will (1) pay a license fee to Nord; (2) pay a royalty fee to Nord for each missile produced; (3) furnish GE-developed technical information relative to the SS-10 and 11 to Nord that occurs during the period of the contract.

Nord will (1) make available to GE all technical and production know-how relative to SS-10 and 11; (2) provide qualified technical personnel to help GE set up production; (3) make available all proprietary information on advanced developments of SS-10 and 11 which could be of use in U.S. development.

Also, (4) provide at no additional cost the results of other advanced R&D activities relative to the program, and (5) permit the U.S. to set up a second U.S. source of production in the event of an emergency, or if Nord is unable to function as a second source.

### New Atomic Generator Under Test By Martin

A compact, lightweight atomic generator which can convert heat from a by-product of nuclear reactors into electric power is being evaluated by The Martin Co.

The 125-watt unit, using no moving parts, could be used to power advanced satellites or space probes for at least a year.

Weighing only 175 lbs., the 34 in. long—24 in. diameter generator contains 277 thermocouples. It offers more power than any energy unit launched into space so far.

Using radioactive Cerium-144 for its power, the new system, called SNAP 1-A, will not be affected by the impact of micrometeorites in space. This was one drawback encountered with previous solar cell work. Work on SNAP 1-A is being carried under Atomic Energy Commission contract.

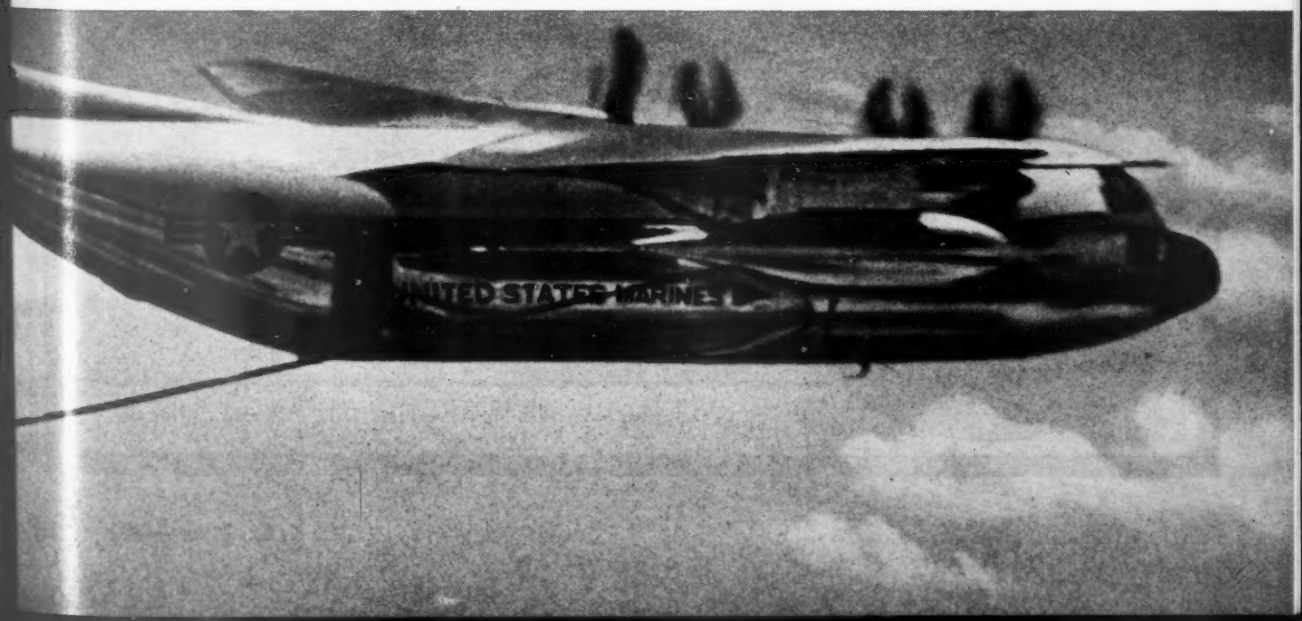
### Past Work Speeds Up Sky Bolt Development

Faster delivery of more economical high energy solid propellants for the Air Force Sky Bolt missile will result from previous experience gained by the Sky Bolt propulsion contractor, Aerojet General.

Commenting on this point, Richard D. Geckler, Vice President-Solid Rocket Plant at Aerojet said "In a very real


Now Marine Corps jets can refuel at 300 knots—over 25,000 feet high. The new GV-1 Lockheed Hercules tanker pumps jet fuel probe-and-drogue style at 300 GPM. There's a hose-pod mounted outboard of the engines on each wing, so the big tanker can handle customers two at a time. The GV-1 can rendezvous with jet fighters at 1000 miles from its home base to off load 28,000 pounds of fuel.
The first of the GV-1s will go on active duty this year.

LOCKHEED
GEORGIA DIVISION MARIETTA, GEORGIA



sense propulsion for Sky Bolt has been benefited from development funds from all three U.S. military services and the National Aeronautics and Space Administration."

Specifically, Aerojet managers cite technology advanced by their work on such missiles as Polaris and the Air Force Minuteman.

Aerojet officials say that estimated savings on Sky Bolt propulsion will run about 20% as compared with time and money spent on former programs involving power plants for missiles of comparable size and performance.

## Five Lockheed JetStars Ordered By Air Force

Air Force has ordered five Lockheed JetStars for use by the Military Air Transport Service Airways and Air Communications Service for in-flight inspections of military navigational aids.

This represents the first order for the Pratt & Whitney JT12A-6 powered aircraft since it won an Air Force UCX competition over the McDonnell 119A last October.

Delivery will be in mid-1961. First Commercial delivery of the plane will be earlier that year.

The subsonic jet utility aircraft flies at altitudes up to 45,000 ft. With its speed and altitude, the plane will be able to duplicate flight paths and approaches of modern high performance aircraft to any terminal control area. The JetStar was originally developed under Air Force request.

## Satellite Research Progresses at GE

A major part of General Electric Co.'s investigative research into feasibility of communications satellites is completed, according to Lt. Gen. Arthur Trudeau, Chief of Army Research and Development.

Speaking to the Cornell University science faculty, Trudeau said the work being done by GE's Advanced Electronics Center fell into five areas: (1) satellite electronics; (2) reliability; (3) environment; (4) noise sources; and (5) anti-jamming.

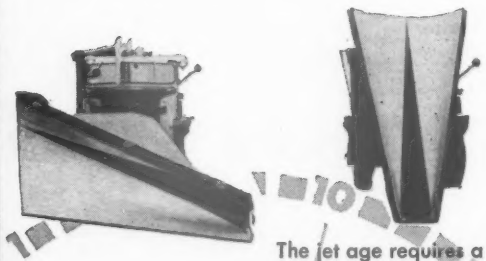
In scheduling the research, the Army is working toward development of a vehicle that would stay in a relatively fixed relationship to the earth, in a 24-hour or synchronous orbit. Of particular interest in designing the communications satellite would be the environment or background noise it would encounter at altitudes over 22,000 miles.

## NASA, Ryan Continue Vertiplane Tests

National Aeronautics and Space Agency has authorized rebuilding of and further tests on the Ryan Aeronautical Co. vertiplane which crashed at Moffett Naval Air Station last February.

Previous success of the testing program led to NASA's decision to rebuild the aircraft for continuation of tests. During the 21 previous flights at Moffett, the following goals were achieved: (1) hovering flight at zero speed, (2) near-vertical takeoff after only a 30-ft. ground roll, and (3) successful conversion from hovering to forward flight.


FRINK Roll-Over Sno-Plows For Airports and Expressways



The jet age requires a speed-up of all operations. End time-consuming *deadheading* with a Frink Roll-Over Sno-Plow. In *15 seconds* the plow can be reversed, hydraulically. Easily detached from the truck, works efficiently with both right- and left-hand leveling wings.

FRINK ROLL-OVER SNO-PLOWS are available in 8, 9 and 10 feet cutting edge widths.

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FRINK SNO-PLOWS, INC., Clayton, N. Y.

In Canada: Eastern Steel Products, Ltd. Preston, Ontario

# Procurement Trends

**PRE-STOCKING IN OVERSEAS AREAS LOOKS GOOD** as one means of stepping up reaction time to limited war situations. Under the program would be supplies and equipment that would ordinarily go by slow sea lift to the point of need. One question that arises: Without overseas bases where pre-stocking would be otherwise practical, what happens to this technique as a way of doing business?

**HEAVIEST SHIPBUILDING EMPHASIS BY FAR IS ON ASW** this year, with 13 of the Navy's total 20 requested ships slated for this kind of work. Also, 14 Mark I destroyer conversions will mean, in essence, 27 new ships for ASW work. Also to be stressed in this area will be oceanography, weapon development, ocean surveillance systems and "unique and promising methods of deduction and classification."

**TOUGH-TALKING MARINE COMMANDANT SHOUP** offered Senate Defense Appropriations Subcommittee one of the most interesting comments on the budget as it was reviewed before that group, to wit: "it is an obvious conclusion that general war is not planned for fiscal 1961 . . . If it is planned, than I say openly that we ought to take the whole Defense Department, including me, out to sea and sink them, because there in nothing in any of these budgets that indicates that a general war is going to start in fiscal year 1961."

**NEW TOP DEFENSE CONTRACTOR IS GENERAL DYNAMICS,** having edged out Boeing for that spot in calendar year 1959. Of the top hundred, missile, aircraft and electronics represented 64. Of $21.7 billion spent on procurement in '59, $15.9 billion went to the top hundred. Following General Dynamics on the list, in this order: Boeing, Lockheed, North American, General Electric, Martin.

**SIX MONTH SLIPPAGE IN ATLAS LAUNCHING SITES** has turned up, will be met, according to Army and Air Force, with review, tightening up of or change in the program. Excuses vary from lack of previous experience in the area to complaints about union strike instigated time-lags. Immediate aim: to confine slippage to soft sites, proceed on schedule with hard ones.

**FURTHER DEFINING OF ADVERTISING ALLOWABILITY** has come from Air Force, prohibits ads "expounding or praising the contractor's product" in Air Force Association's magazine or similar publications. Such periodicals, according to Air Force Assistant Secretary P. B. Taylor are not trade or technical journals as defined under ASPR 15-205.

**BIG REASON BEHIND NAVY'S INSISTENCE ON A NEW CARRIER** was laid on the table before the Senate Defense Appropriations Subcommittee by Adm. CNO Arleigh Burke in no uncertain terms: "We need it very badly because if we do not have any more new carriers than the ones we have now under construction the day will come when we cannot keep the 6th Fleet in the Mediterranean or the 7th Fleet in the Pacific—one or the other will have to go."

**COMPTROLLERS DON'T MAKE DEFENSE POLICY DECISIONS,** in spite of accusations to the contrary, according to Defense Comptroller Franklin Lincoln. By way of defense, Lincoln pointed out that the budget cannot be put together in a vacuum: "DOD prepares the defense program and the comptroller's office evolves its accompanying budget." Lincoln spoke before the Fort Monroe research and development conference recently completed.

## New Security Policy Unveiled by Defense

A new look in industrial security which promises to drastically cut the amount of time, money, and paperwork involved in that area, has been initiated by the Department of Defense.

Aim of the new policy is to insure that weapon systems are classified only insofar as security is involved—so that if, for instance, only the guidance system on a missile is of a security nature, the rest of the missile will not be subject to security restrictions.

Also, the new policy provides for periodical review of all classified weapon systems and their components to see if classifications involved still apply.

The new policy, developed by the Office of the Assistant Secretary of Defense for MP&R, with Assistant Secretary of Defense for Public Affairs, will place stronger emphasis on *why* a given project is classified rather than *what* should be classified. Using the new rule of thumb, a much simpler classification and security structure should evolve.

The new system will apply to all new future major weapon systems, and will be "retroactive at the discretion of contractors."

Among potential benefits under the new program are: (1) fewer contractor employees will need security clearances; (2) costly transmission and storage of classified documents is reduced; (3) cost of shipping classified end items and component parts is substantially reduced; (4) expensive restricted areas and their maintenance with enclosures and guard posts will be reduced or eliminated; and (5) costly maintenance of plant security programs may be substantially reduced.

Key to the new security system is revised Defense Department Form 254 security check list. This form will be adopted throughout all military departments for contractor use.

## Pipeline, Repair Times Slashed by Air Force

Air Force AOCP rates (aircraft out of commission for parts) have been cut by 69% since 1952, according to Gen. S. E. Anderson, Air Materiel Command Chief.

Anderson told the Aero Club of Washington that "ability of our combat forces to react depends largely on how many functioning weapon systems are on the line when the order is given."

In 1952 the world-wide Air Force AOCP rate for all its weapon systems was 8.9% of actively deployed weapons out of service for maintenance or repairs. On the day of the recent Summit crisis in Paris, the rate had been reduced to 2.7%.

"Similarly, between 1955 and 1960, average pipeline time on priority AMC requisitions has been reduced by one-half. In 1955 it was 12 days—now it is six. For routine requisitions, the time was reduced one-third—from 30 days in 1955 to 21 days in 1960."

Anderson also cited the effectiveness of the San Bernardino, Calif. ballistic missile depot. Using an IBM 705 computer, the system can monitor 36,000 Thor IRBM parts, 41,000 parts for Titan and Minuteman and 56,000 parts for Atlas. In spite of this, priority Atlas items can be delivered anywhere in the country in 26 hours. Routine requisitions take 120 hours.

Further Anderson predicted a "new high in logistics speed and efficiency" would be reached when the support complex for Minuteman is opened at Ogden, Utah in 1962.

## New Handling System Set For Navy Material

Purchase and installation of an automated materials handling system at the Navy Supply Center, Bayonne, N.J. represents a move "toward a new concept in the issue of bin storage material," Navy has said.

With initial work to begin within about two months, the new system will rely on conveyors, diverters and other automatic equipment to reduce operating costs and processing time while still maintaining the necessary degree of service to using commands.

The Bayonne installation will have two unique features, as opposed to other Navy facilities looking over the same techniques. First, stock issues will be accumulated and released automatically for packaging and delivery for the first time. Also, the stock moving from bin or accumulator will be segregated automatically for best transportation rate.

The new system will move about 4500 different line items daily through powered and gravity conveyors, automatic diverters and accumulators activated by pre-set signals on tote boxes.

## Air Force Reluctant On Single Supply Work

Apparent Air Force reluctance to accept single management responsibilities has been cited by the House Military Operations Subcommittee, in a follow-up report on military supply management.

The report said AF "has been least interested in common supply activities and has resisted single manager and related supply programs except when acceptance could result in increased power, prestige and resources."

The House group noted a tendency to "bury" single managers within Air Force, to head off development of a fourth service of supply.

The Subcommittee noted that Air Force has no single manager assignments, even though it has more personnel than Navy, and more funds than either Army or Navy. The report called for Air Force to delegate responsibilities which the single managers can perform more efficiently than the service. Further, it recommended more supply training for Air Force personnel and more participation in common supply programs.

The report reaffirmed earlier recommendations urging against Air Force assignment of single manager responsibility for electrical-electronics equipment.

Before such a step would be taken, the Subcommittee advised a "careful examination" of Air Force's capability. The group also called for Defense Department to analyze probable military structure by 1970, and set up appropriate supply management arrangements by that time.

## Polaris Sub Tender Commissioned by Navy

Navy's first Polaris submarine tender —the USS *Proteus*—has been commissioned by the Navy at Charleston Naval Base.

It is the first vessel equipped to carry and maintain Polaris missiles and service fleet ballistic missile nuclear submarines. The *Proteus* is a converted Fulton-class submarine tender.

Missiles will be carried in the de-

mothballed tender in special airtight liners completely encasing the missile. An umbilical cable passes through the liner to the missile for checkout purposes.

*Proteus* will draw her stock from the Polaris final assembly and issuing facility, near Charleston Naval Base.

## Drone Funds Drop In Fiscal 1961

Money spent for drones and aerial targets will drop $30-million in all three services for fiscal 1961, as opposed to fiscal 1960.

Army will spend $39.5-million in this area, Navy $33.1-million, and Air Force $26-million. Navy's figure is the only one including support equipment.

The drop in spending as opposed to fiscal 1960 is due to a changeover in the makeup of airborne and space drones because of the decline in military aircraft orders and the up-swing in missile orders. Dictated by weapon transition, the conversion to new drones should be complete by the mid-1960's, with drone orders again on the rise.

By that time, the services expect to have four main types of drones: (1) those for testing tactical and strategic anti-missile systems and training AICBM crews; (2) spacecraft target drones for testing anti-satellite and anti-spacecraft systems; (3) reconnaissance surveillance drones, and (4) combat drones for chemical and biological agents.

Within this framework newer materials, smaller electronic components and propulsion systems, and lower costs will be the main aims of defense drone developers.

## Greater Range Built Into A4D

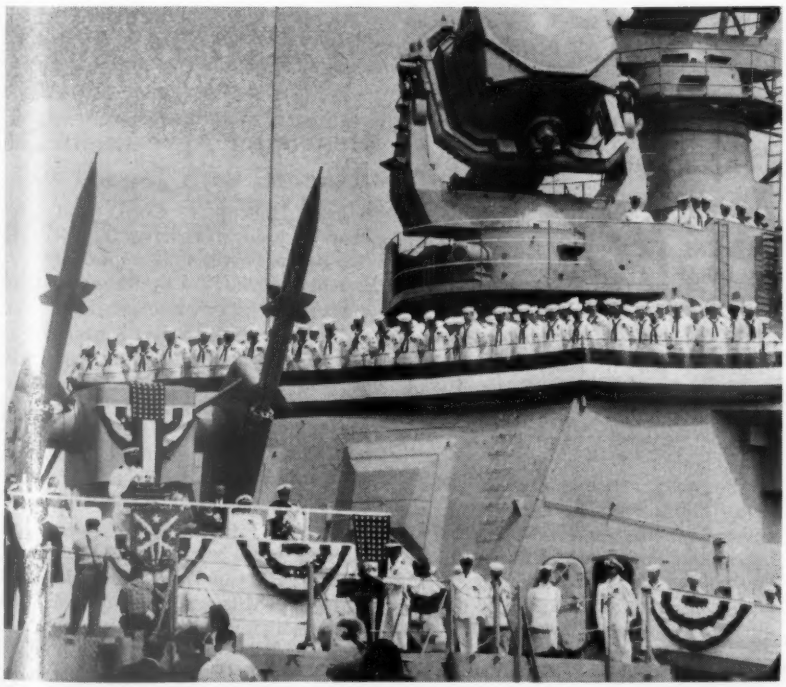
A new, improved version of the A4D attack aircraft will be built by Douglas Aircraft Co., under a recently announced Navy contract.

To be designated A4D-5, the new plane will primarily offer better range and payload capabilities over the current A4D-2N now in production and operational.

The A4D-5 will be powered by the more powerful Pratt & Whitney J52 engine, generating 8000 lbs. thrust. Earlier versions used the 7700-lb. thrust Wright J65. The new craft will also be equipped with a Douglas ejection seat recently approved by Navy for new and in-fleet A4D's.

Currently, about 1100 of the A4D series aircraft had been delivered to the Navy.

## *New Missile Cruiser*



USS SPRINGFIELD, Navy's newest light guided-missile cruiser, has joined the fleet. Main battery of the new ship consists of a two-missile Terrier surface-to-air launcher.

## Renegotiation Stressed By House Committee

A permanent version of the presently temporary Renegotiation Act has been proposed by a special House Armed Services Procurement Subcommittee, along with new restrictions on incentive contracting.

The Committee report stated that incentive contracting constitutes pricing by "formula and not on fact." Thus, it urged adoption of legislation requiring certification of costs by the contractor "so that at the time of final payment it can be ascertained if the figures used in the negotiation were accurate and true."

The subcommittee said that "cost-plus-fixed-fee contract and the fixed-price incentive-type contracts are shrouded in the gravest of doubts as to their effectiveness as contractual instruments."

As opposed to this sort of contracting the subcommittee espoused either firm-fixed-price contracts or price redeterminable contracts. Of the latter, the committee said that it offered "the soundest and more exact approach to the problem."

## Basic Research Money Stepped Up by AF

A stepped-up basic research funding target of $70-million has been set up by the Air Force, with steps in that direction to begin in the forthcoming fiscal year.

In fiscal 1960 Air Force's initial basic research request was $34.8-million. In fiscal 1961 it will be $7-million higher or $42.1-million.

Air Force has also emphasized its vigorous support of Congressional authorization enabling Defense Department to issue research grants.

Air Force is also working on new instructions and procedures under this regulation which will greatly improve relations between the scientific community and Air Force, allowing easier, faster procurement in basic research.

Further, Air Force has rewritten its manual 172-1 to allow contracts with university research groups for periods of up to five years, unlike the usual short time limit on military contracting.

## Cargo Aircraft Group Named by Defense

A top level *ad hoc* advisory panel for evaluating military cargo aircraft has been announced by Defense Department.

Aim of the group will be "to estab-

lish criteria for evaluation of cargo transport aircraft systems." The group will work under the aegis of the Office of the Director of Defense Research and Engineering.

The group will be headed by Charles Froesch, VP-engineering of Eastern Air Lines. Representing the Office of Secretary of Defense will be Carl Covington, member of the Advisory Panel on Aeronautics and Cdr. R. C. Dennehy, executive secretary, Office of Tactical Weapons in DDRE.

The remaining eleven members of the group are from the air transport and air frame industry. While no immediate sessions for the committee are scheduled, DOD pointed out that "its members will be available for consultation and sessions of the group will be convened when their aid is needed."

## $47-Million Saved On F-105 Costs

Accumulated savings of some $47-million in the cost of producing the F-105D fighter-bomber have been recorded over an eighteen month period by Republican Aviation Corp.

The result of plant-wide cost reduction measures, the successes stem from in-plant measures to shave costs, such as integrated tool improvement, methods study, engineering analysis, improved scheduling and work load controls including daily and weekly direct labor cost controls.

Indirect costs in support of production, such as tooling, quality control, maintenance, production control and procurement were analyzed and new budgets set.

Republic explained that economies effected in these indirect areas alone brought in savings of $10-million, despite increased direct labor costs coming from a production build-up.

"On-site" savings represent almost 32% reduction in costs for fiscal 1960 orders as compared with fiscal 1959. In terms of dollars, the average unit cost on the F-105D will be some $450,-000 less in fiscal 1960 than in the previous year.

## Industry Security Class Announced by Defense

Five sessions of a Management Security Course at Army Intelligence School between August 1960 and April 1961 have been announced by Department of Defense.

Aim of the course is to achieve among security personnel of industry a common understanding, interpretation, and application of Defense Department rules and directives in this area.

The course is offered without charge to security officials of industry responsible or about to become responsible for safeguarding classified information pertaining to industrial contracts with Defense.

In the past four years during which the course has been run, over 2800 representatives of industrial and educational organizations have attended.

Included in the course are classes in basic principles, clearances and denials, security requirements, and vulnerabilities and control.

## More U-3 Aircraft Purchased by AF

Air Force has contracted with Cessna Aircraft Co. for an additional 35 U-3 aircraft—military version of the Cessna 310.

Along with the U-3 aircraft, Air Force has bought a new concept in logistics, relying on the world-wide Cessna International organization for supplies of spares. By using the commercial facilities of the manufacturer, Air Force has been able to maintain the highest in-commission rate of any AF plane with the U-3.

This will be the third off-the-shelf order for these aircraft that the Air Force has placed. Planes covered under the new contract will be designated U-3B, and will represent an improved version of the U-2A previously purchased by the Air Force.

## New Positioning System Contracted Out by Army

Army Signal Corps has let a $2-million contract for work on an electronically-controlled battlefield position-fixing and navigation system to Bendix-Pacific Div. of the Bendix Corp.

The new system will let a field commander behind the battle line know the position of all of his units, including aircraft, tanks, trucks and other ground vehicles, as well as foot soldiers.

The system is described by Bendix as a "highly mobile, lightweight, accurate, low-frequency area-position fixing system for ground/air use in any kind of weather. To be designed for helicopter transport, the system will be able to produce "instantaneous and precise navigation information day and night to all tactical units within a 150,-000-sq. mi. area" Bendix says.

The system will be composed of three basic sub-systems: (1) four ground-based transmitting stations, (2) mobile receiving stations, and (3) a chart construction and reproduction unit. The contractor says there will be no limit to the number of units that can be handled by the unit.

## Titan Test Contract Goes to Remington Rand

Electronic ground guidance computers for the Air Force Titan ICBM will be covered under AF contracts with Remington Rand Univac totalling over $26-million.

The new contracts define previous letter contracts which authorized Univac to design and develop a computer with the speed and reliability to put Titan on target, up to ranges over 6000 miles. Prototype models of the Univac ground guidance computer—called Athena—have functioned satisfactorily in each of Titan's guided flight tests.

Athena ground guidance computers were tested initially in a series of Thor-Able missile firings in 1959. Knowledge gained in this program is being applied to Titan, resulting in considerable time and money savings in the Titan research and development program.

Completely transistorized electronic circuitry contributes to the Univac computer's compactness and economy of operation. Athena dissipates a mere 800 watts compared to the 40 kilowatts needed for equivalent vacuum tube computers.

## Helicopter Agreement Reached with Japan

Bell Helicopter Corp. and Fuji Heavy Industries have reached an agreement covering the production in Japan of Bell HU-1B turbine powered helicopters.

Under the seven-year contract, Fuji will import engines from Bell and make the body and wings in their own facilities. Bell will be paid $375,000 as initial payment, and between $15,000 and $20,000 for each helicopter sold, with Japan and Southeast Asia as the most likely markets.

Besides Fuji, two other Japanese manufacturers have applied for permission to produce large-type helicopters in Japan—Mitsubishi Heavy Industries Co., Reorganized, and Kawasake Aircraft Co. The former wants to produce the S-61 under an agreement with United Aircraft, and the latter the Vertol V-107-II under a Boeing license.

# Newsletter

**Armed Forces Management Association**
**Washington 25, D.C. Phone: OTis 4-7193**

**National President: Hon. George H. Roderick** **Exec. Vice Pres.: VAdm. Harry E. Sears, USN, ret.**


## Resolutions, FY '61

Resolutions submitted at our recent National Conference by a committee headed by Colonel Robert H. Shell, President of the prize-winning Atlanta Chapter, have been approved by AFMA Board of Directors. These resolutions provide a firm base for the Association's program for the new fiscal year, and are presented in toto for the benefit of the membership, military and civilian managers at all levels throughout the defense establishment, and our friends and supporters in industry and education:

*Whereas* Recruitment of high calibre personnel is necessary in producing an efficient defense organization; and good public relations and an understanding of the defense organization is essential to an enlightened citizenry

*Resolved* that: AFMA chapters are encouraged to establish and support student chapters at universities in their areas.

*Whereas* The general public and especially the average business man, middle & top management personnel in American commerce and industry, know very little of the strides and sincere efforts made by the Armed Forces in the field of management in order to afford the country maximum defense potential for the least possible share of the tax dollar, it is our duty to help inform the people of the United States.

*Resolved* that: AFMA will encourage and assist its members in speaking to local community groups to tell the story of management improvement in the modern Armed Forces.

*Whereas* The Armed Forces Management Association recognizes the desire of all management personnel in the Armed Forces to produce the greatest possible defense posture within the resources provided, and

*Whereas* Sound management practices and procedures contribute to achieving such efficiency, but are dependent upon the necessary flexibility and stability in the use of available resources, and

*Whereas* The programming and budget systems of the Armed Forces may be unduly restrictive in permitting maximum utilization of resources.

*Resolved* that: The Armed Forces Management Association favors a program and budget system for the Department of Defense which will provide resource managers at all levels with greater stability and flexibility in using the human and material resources made available for the accomplishment of our mission.

*Whereas* Austere or stringent manpower and fund limitations continue to be imposed by executive or legislative actions on defense establishments notwithstanding mission or state or readiness requirements in consonance with national defense or international commitments, and

*Whereas* Under these conditions, now more than ever before, maximum utilization of resources to accomplish assigned defense missions dictate that the creative and management ingenuity of all, who are concerned in any way with planning, management, execution, and processes be solicited and utilized.

*Resolved* that: AFMA membership resources be sharply focused on management techniques, including education and utilization of capabilities of members, in studying, analyzing, and devising worthwhile management contributions to Defense Activities Management. This should include emphasis on administrative and management techniques designed to reduce overhead costs and permit adequate staffing for the accomplishment of necessary Department of Defense missions.

a. Improve methods for identifying and eliminating unnecessary layers of supervision.

b. Improve organization and staffing patterns, and

c. Establishment of equitable ratios of helpers and juniors to journeyman trades and crafts employees.

## Directors Meet

Meeting for the first time since the national conference, the Board of Directors reviewed the Association's progress over the past year, and learned of plans for furthering our objectives and for continuing our fine membership growth. (See Annual Report, July Newsletter.) Especially noted were the solid financial position of the Association, the addition of numerous new chapters during the past twelve months and the sharp upturn in membership at a number of chapters following the national conference.

The suggested plan of the Gosport Chapter at Norfolk for the appointment of six, regional vice presidents to help stimulate interest in and growth of the organization was unanimously approved. First to be honored by appointment to one of these new offices was C. Baxter Spencer, dynamic president of the Norfolk group, whose coverage will embrace the Middle Atlantic, or Second Army area. Other outstanding AFMA leaders will soon be named to head up the remaining five areas, which will coincide roughly with corresponding army areas.

Also approved at the meeting was a design for an AFMA pin, upon which all chapters were asked to comment. Selected was a small, dignified, simple gold insigne, readily adaptable for lapel button, tie clasp or car ornament use. Bids have been let, and the membership will be informed when the devices are ready for sale.

Next AFMA National Conference, Washington 28, 29 February-1 March, 1961.

*(The following news items are extracted from the proceedings of this year's Armed Forces Management Association convention, held in Atlanta, Ga. Full reprints of these speeches—and the others presented to the meeting—will be available in the AFMA Journal, to be published early this fall.)*

## Component Development Stressed by Hayward

A strong bid for careful component development and better decision-making was entered at the AFMA convention by Vice Admiral John T. Hayward this year.

Hayward also pointed to problems encountered with the current budget system. He said he did not know how much money he would get in 1961, and yet was trying to prepare a 1962 budget.

Given a tight budget, and the many motions which must be exercised in order to actually get the money, Hayward said there was tendency to drag out programs. But, he said, "If you drag out a program, it costs you more by at least 30% . . . this is a costly way of doing business, and we would definitely recommend against it."

For the future, Hayward said that ideally Navy's researching budget would be spent largely on component, exploratory development and basic research work. He said "I would hope ultimately to have only 25% of my budget in systems work."

Citing the Russian missile program as a good example of careful, step-by-step development, Hayward pointed out that Russians "didn't call out for a 5500 nautical mile missile with a warhead of so many megatons or CEP of half a mile, no, they started right off with maybe the extension from the V-2 to 300 miles—500—900, working all the time on the components and what was the missile engine."

By asking for too much too soon in a development program, he said, "you are asking for trouble—you delay for years bringing a system into being, and by delaying it it becomes obsolete and you've spent an awful lot of money and an awful lot of hard pulling." Hayward said, "This is the sort of thing we cannot afford technically and are trying to prevent in the Navy."

## Fast Development Keys Outlined by Bradley

Four "major and over-riding factors" determining development program success were outlined at this year's Armed Forces Management Association Convention by Lt. Gen. Mark E. Bradley, Jr., DCS/Materiel U.S. Air Force.

The factors Bradley cited were (1) urgency; (2) status of component development; (3) stability of program and configuration; and (4) assignment of best possible talent to the job, both military and contractor.

Bradley said that without urgency, "You cannot expect a stable program and you are almost sure to be late." On stability of program configuration, the Air Force general said, "If you permit indiscriminate changes of either you are headed for trouble." Referring specifically to the development program on the Hound Dog air-to-ground missile, Bradley pointed out that Air Force was able to cut its original schedule by about 20%, even though it was tight to begin with. Citing the prime management factors in achieving this time cut, Bradley pointed particularly to management's decision to hold to on-the-shelf knowledge and capability, and Air Force's staying with its own original requirements.

No less important, Bradley said were the factors of coordination among the contractors involved and the "nationwide" support the program received.

## ARPA Chief Betts Describes Agency Role

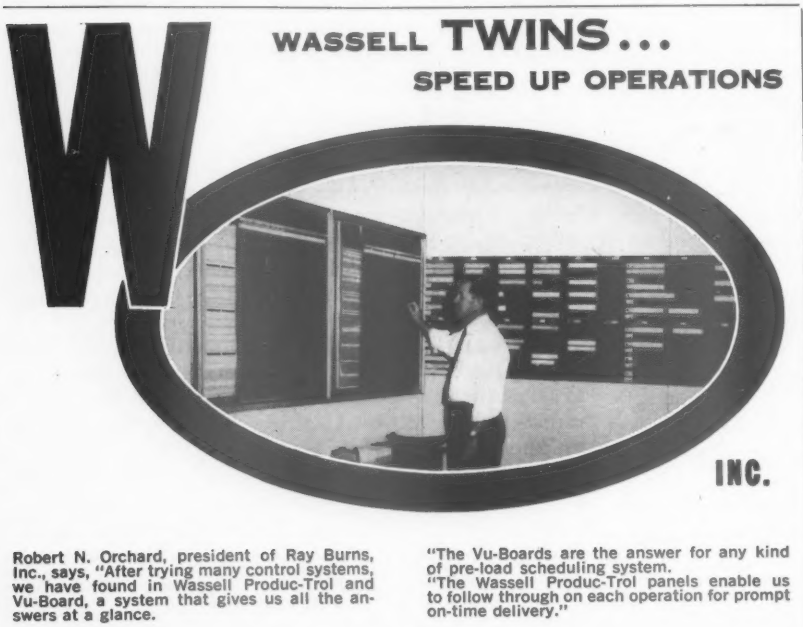
Advanced Research Projects Agency's "indirect" contribution to the reduction of leadtime, and its role in overall military weapons development were outlined to AFMA by ARPA Director Brig. Gen. A. W. Betts.

Using the solid propellant research effort in ARPA as an example, Betts said ARPA was given the program when "the well of fundamental information in this area (was) drained dry. Thus the ARPA program is intended to refill the well.

"We go quietly about trying to advance the state-of-the-art leaving weapon developers free to concentrate on more mundane problems." Working in such areas as improving the flow of technical information, Betts said ARPA has a Solid Propellant Information Agency, handled by Applied Physics Laboratory.

"Every effort is made to speed the interchange of information" among the more than 50 industrial, academic and government laboratories working in this area, Betts said.

Summing up, he said, "to the extent that we can succeed in advancing the frontiers of knowledge in this or any other advanced research field, ARPA is concomitantly raising the presently limited threshold of somebody's state-of-the-art dead-end. Our 'breakthrough' becomes ultimately his working tool."


Robert N. Orchard, president of Ray Burns, Inc., says, "After trying many control systems, we have found in Wassell Produc-Trol and Vu-Board, a system that gives us all the answers at a glance.

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## Human Factors Cited By Army's DCS/Pers

Essential elements of leadership affecting leadtime were outlined for the AFMA Convention by Lt. Gen. James F. Collins, Deputy Chief of Staff for Personnel, Army.

The three factors cited were: command decisiveness, effective communication and sound personnel management.

The first of these, Collins said included not only the need for clear cut decisions, but increased delegation of authority, and at the same time, more careful review of staffing to avoid "managers who manage managers."

Second, Collins said selective communications are mandatory. He said to cut leadtime, top management must not be "deluged" with reports on details, and that at lower levels commanders are often overwhelmed with non-essential data. He said "we must keep the channels clear for essentials."

On the third essential, sound personnel management, he said "It is not enough that people just understand what is required of them. They must be motivated to do what is expected."

## Hard Core Managers Needed by Government

Gordon M. Bain, Vice President-Sales for Northwest Airlines, Inc., has called for a "permanent core of trained managers who are competent and who will retain their authority during periods of emergency."

Such a group, Bain told this year's AFMA conference, would provide the military establishment its strongest tool to reduce leadtime through management.

Bain sharply criticized "executives who use almost any device known to man to avoid reaching a decision." He pointed out that the manager with courage accepts the risk of failure and proceeds as his judgment dictates knowing that in the large majority of cases he will be right and his organization more effective for it.

Bain favorably compared government management with that of private industry, and pointed out that good management requires courage, understanding and "getting off the chair once in a while and taking a look and listening to your people."

## Decision Making Timeliness Stressed

Timely decision making as a means of cutting leadtime was stressed at this year's AFMA convention by Thomas A. Callaghan, Jr., of Defense Products Group, Ford Motor Company.

Callaghan pointed out that "if a decision is required to prevent program delay, failure to make the decision is tantamount to deciding to delay the program."

Going one step further, he said "even more serious is failure to recognize the fact that there is not a one-to-one relationship between decision delay and program delay." He cited a one day decision delay on a construction program as conceivably meaning a six to sixteen month delay if a construction season passes.

To avoid this sort of thing, Callaghan stressed the value of program control techniques which are available to the manager today. Such techniques as line-of-balance, the Gannt System and other control techniques, Callaghan said, could go a long way towards avoiding program delays through late decisions.

## BuWeps Organization Outlined by Pehrson

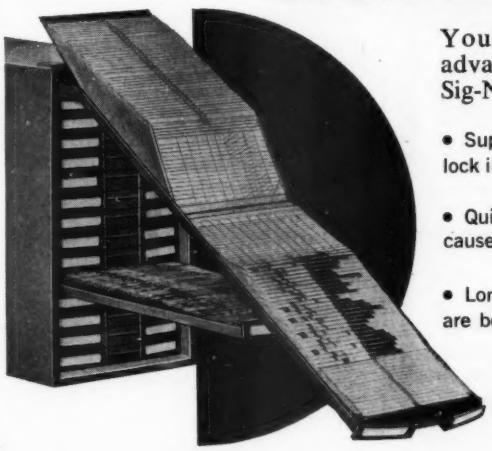
Major objectives of Navy's new Bureau of Naval Weapons were outlined for the AFMA Convention by Gordon O. Pehrson, Assistant Chief for Program & Management Plans in that organization.

Among the objectives, Pehrson said, was to improve planning and control functions needed to give top management continuing and objective analysis and control over new weapons programs. Also, the new bureau is to "more completely integrate" the planning and management of all phases in weapon life, thereby smoothing transition from one phase to another.

The need for more complete and relevant information was also cited. Aim would be to give top management the ability to make timely decisions on such questions as (1) to proceed with new weapon development; (2) to go into production for fleet use; (3) to abandon projects completely, or (4) to set them aside until state of the art or financial environment would allow their exploitation.

Pehrson also underlined "the big challenge to management in this new problem . . . of organizing exposure to the flood of attractive technical offerings constantly being presented for consideration. The most important element of this," he said, "is the linkage between those who can assess the military significance of scientific discovery or invention and those who have knowledge of its existence."


# LOOK at all THREE



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# The Sixth of Fourteen Erroneous Postulates

## *6—The governing structure of an organization is a net of personal relations.*

**by Leland B. Kuhre,**
**Col., USA (ret.)**

**Founder and Director The Academy of Organizational Science***

The postulate is erroneous as a starting assumption from which to form or operate the organization of collective-human-effort-for-a-common-purpose.

Repetition and prestige-utterance have given postulate-weight to many generalizations on the primacy of personality and personal relations. The most familiar is a prevailing empirical science hypothesis: An organization is a superstructure of personal relations on a structure of broadly defined functions.

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A *net* or *network* is best visualized in association with its synonyms—*system, organism, scheme, economy,* and *complex*—in Webster's *Dictionary of Synonyms* wherein "'*network* literally applies to any fabric or structure made of threads, cords, wires, etc., crossing each other at intervals; figuratively it applies to any system, especially any physical system, that has a corresponding structure with all its intercrossing threads coming under a central government or control; as a vast *network* of railroads."

The "intercrossing threads" in a net of personal relations connect persons. The basic element is the relation connecting any two persons, "A" and "B", and, if the postulate is valid, the element should be a definite thing. Let's try to find it.

In *A*'s mind is a conjecture about his relation with *B*. This conjecture is a mixture of *A*'s self-knowledge, *A*'s motives, *A*'s overt acts, *A*'s interpretation of the words and acts of *B*, and *A*'s assumptions about *B*'s motives. *A*'s conjecture continually changes; it is valid only at a hypothetical time "t." Denote this conjecture in *A*'s mind (m) as $(A_m—B)_t$.

In *B*'s mind there is a similar conjecture from his standpoint about the relations connecting him with *A*. Let us denote this by $(B_m—A)_t$.

A third party, "C", makes inferences from *A*'s words and acts with respect to *B*, and from *B*'s words and acts with respect to A. Within his mind, *C* forms his conjecture about the A—B—A relation, but it is only valid at the time "t". Let us denote *C*'s conjecture by $C_m(A—B—A)_t$. A fourth party, "D", will have in his mind a different conjecture denoted by $D_m(A—B—A)_t$. And so on with different conjectures from everyone concerned with the A—B—A relation.

Thus the relation connecting *A* and *B* is represented by a minimum of three different conjectures: $(A_m—B)_t$, $(B_m—A)_t$, and $C_m(A—B—A)_t$. These cannot be taken out of the three minds to form one definite thing in a system; the relation has no existence as a segment of a thread in a net; and, such as it is, it is only valid as of a time "t", tomorrow it may be greatly changed.

Consequently, any person's image of a net of personal relations connecting tens, hundreds, or thousands of persons is an illusion. Instead of *net,* a more accurate metaphor is "fluxional conglomerate"—a continually changing, self-cementing cluster of miscellaneous person-with-person relations gathered from various sources. A frequent metaphor is "can of worms."

A net-illusion as the governing structure of an organization is inherently unstable and unpredictable. Its inefficiencies are generally written off because responsibilities cannot be fixed. But sometimes the losses are too big to escape notice, as happened when *Time* magazine (3 August 1959) reported that the "too many cooks" government of a large well-known U.S. corporation was forced by customer complaints to take a loss of over $7-million to correct a series of overlooked errors in production processes.

The postulate is not only erroneous, it is hazardous. To use a net-illusion as the starting assumption for forming and operating an organization is to invite self-seeking manipulation of individual responsibility and accountability at the expense of the common purpose. Every person's illusion is both unique and unknowable.

The postulates of a rational science of organization must emanate from a concept of the governing structure as a system of contractural relations connecting definite individual decision-contracts calling for all needed individual contributions, intellectual and physical. Every person can see his place in the same system displayed in a model. Every person's responsibility, accountability, rewards, and penalties are contractual, automatic not problematic, continual not crisis forced, fixed not evadable, deserved not scape-goat, and gold-fish-bowl-predicted not personal-relations-manipulated.

**Author Kuhre can be contacted at P.O. Box 5274, San Antonio, Tex.*

## PROTECTING SHAREHOLDERS' RIGHTS

Less than 100 years ago, the New York Stock Exchange had occasion to request some financial information from a leading railroad company of the day.

One of the officers shot back this emphatic reply:

"We make no reports and publish no statements—and have not done anything of the kind for the last five years."

This story, although historically true, strikes us as unbelievably quaint. It wouldn't happen today for the simple reason that it couldn't. We've come a long way in an area that is sometimes called "corporate democracy."

This may sound like a pretentious phrase, but for the owner of common stocks it means the right to receive information about his companies and to cast an informed vote on important company matters.

### *Why the Right to Vote*

On the New York Stock Exchange, for example, all common stocks carry the right to vote, and companies are expected to solicit proxies for all stockholder meetings. Thus shareowners of stocks listed on the Exchange are guaranteed a voice in selecting directors of the company in which they have invested money. The proxy enables them to vote conveniently by mail if they desire.

Furthermore, all Exchange listed companies are required to furnish annual reports directly to shareowners, and these reports must contain a financial statement certified by independent public accountants. In addition, the Exchange urges all companies to issue quarterly earnings reports too, and the great majority do.

In general, companies listed on the Exchange agree to a policy of prompt disclosure to the public of any important news—dividend action would be one illustration—in which shareowners, and the general public have a justifiable interest.

Just how important is the shareowners vote nowadays? Is the ordinary small investor really equipped to express himself on important corporate matters? Doesn't he usually vote with management because he doesn't know any better?

### *The "Little" Voice is Heard*

It's true, of course, that stockholders most often do vote with management—but this merely reflects their satisfaction with the way their companies are being run. And on the other hand there are a number of instances where stockholders have banded together to demand changes in the management or policies of their companies. Through a study of the facts, and forceful arguments, many of these groups of "little" stockholders have won their points. Individually and collectively the small stockholder does indeed have a "voice."

"If I'm the part owner of a company I want to know as much as possible about the business," a 35-year-old shareowner in Illinois commented not long ago. "Thanks to the annual and quarterly reports my company issues, I do."

In this connection, it's a good idea to remember that there have been times in American history when the popular vote was dismissed or condemned on the theory that it would not be used intelligently or effectively. If you're familiar with America's political history, you know this theory is as dated as the one about the earth being flat.


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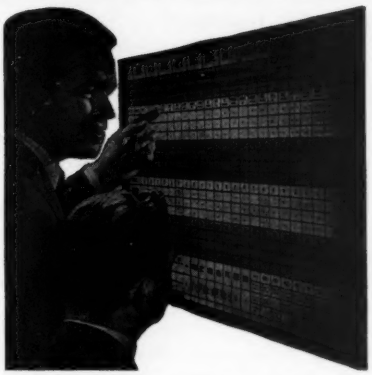

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# In My Opinion

**Favorably Impressed**

We were very favorably impressed by your editorial "Common Sense—Who Needs It?" in the May 1960 issue of ARMED FORCES MANAGEMENT. This is one of the best presentations we have seen of the case for work simplification and how to approach it.

As we are about to conduct work simplification training, we would like to make reprints of this editorial to furnish to persons attending the courses . . .

*Paul B. Russell*
Chief, Management Branch
U.S. Army Engineer District, Seattle

**"Blinding Flash . . ."**

Have just finished reading the July issue and, as usual am impressed with the highly interesting and informative articles presented.

However, one point in particular seems worthy of more detailed exposition and elaboration. After carefully examining the organization chart on page 23, I am convinced that you have unwittingly put your finger on a condition that cannot help but contribute to the military management problems you have so capably outlined in considerable detail. In fact, the solution was so apparent, I am astounded that no one had ever thought of it before.

It suddenly came to me in a blinding flash of realization that if some way could be found to have Army Commands report to the Comptroller of the Army while the Air Force Technical Services reported to the Comptroller of the Air Force, we could undoubtedly save a dozen or more manhours every year (after the first year, of course.)

I trust that you will spare no conferences in seeking a quick solution to this organizational impasse, even including recourse to Parkinson himself as a last resort.

*C. D. Woods*
Clinton, Md.

**Even at this late date, we can only be awed at the perspicacity of your management abilities. Implemental finalizations currently in the near-operational stages will organizationally take remedial steps both within the Defense Department and among our own proofreaders.—Ed.**

**Look to the Sea**

Mr. Borklund says (re: Today's Military Strategy: Is It National Suicide) that to protect our aircraft from enemy ICBM's "aircraft must be capable of infinite dispersion on the ground, etc." I wonder whether Mr. Borklund has evaluated and discarded the suggestion of Oskar Morgenstern ("The Question of National Defense") to the effect that an Oceanic Defense System of seaplanes be adopted for making our retaliatory force secure. I see no reason for thinking in terms of "infinite dispersion on the ground" unless one is committed to some "parochial" view of defense.

*Thurman T. Morgan*
Wilmington, N.C.

**Morgenstern has been evaluated, and by no means rejected. But this series dealt only with existing or seriously considered weapons or weapons possibilities. Since there are no major seaplane programs existing or contemplated in the present defense set up, the concept was ruled out in these terms.—Ed.**

**Readership Survey**

You will undoubtedly be interested in the queries we've received as a result of the articles on the Aeronautical Systems Center. On the management analysis article we were queried by the Air Reserve Center, Denver; Hq Eighth Air Force, Westover, and from a Marine Corps Major enrolled at George Washington University.

On the pricing article, we received letters from a Navy Commander located in Mechanicsburg, Pa., a full day's conference with people from Hq. USAF, and a letter requesting even more detailed information from the Director of Procurement and Production at the Sacramento Air Materiel Area.

This is only a small example of the scope and types of audience reached by your magazine. We hope future articles will prompt as much interest.

*John E. Fawcett*
Air Materiel Command
Aeronautical Systems Center

**Could Stand Another**

I am very grateful for the issues you have forwarded as they have proved very informative to the RAF Working Party researching EDP.

Many thanks to you for your excellent article "How Officers Get Promoted" some time back. The article was exceptionally well-written considering the difference in promotion philosophies among the Services. I have recommended it to many officers as an insight to the promotion machinery and its problems.

*Captain O. Acquaviva*
Hq Bomber Command
RAF, High Wycombe

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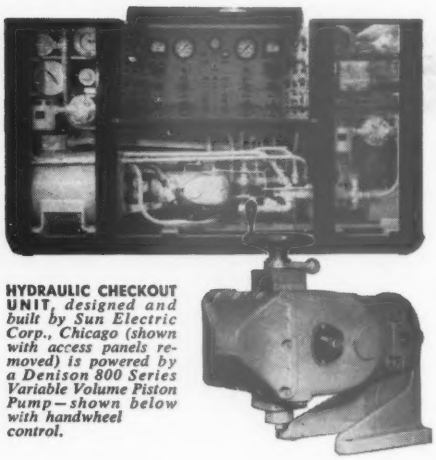

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